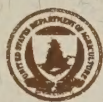


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United States
Department of
Agriculture

Forest Service

Northeastern
Area

NA-TP-07-96

Forest and Riparian Buffer Conservation



**Local Case Studies from the
Chesapeake Bay Program**

*Forestry Workgroup
Nutrient Subcommittee
August 1996*

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Dear Stewards of the Chesapeake Bay:

Forests are important to the Bay. Trees and forests help to keep the waters of our streams and Bay clean and provide critical habitat for fish and wildlife. They cool and beautify our cities and communities, add value to our property, and supply essential products for our use. Forests also help to keep our watersheds resilient in the face of increasing pressures to use the land and its resources. Forests are needed more today than ever to restore and sustain the Chesapeake Bay.

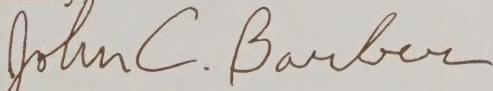
I would like to present to you *Forest and Riparian Buffer Conservation - Local Case Studies from the Chesapeake Bay Watershed*. This publication is a collection of case-studies that highlight accomplishments of local governments and citizen organizations to recognize the importance of forests to their communities and to take action to retain and restore those forests. It illustrates, in two separate sections, innovative riparian buffer and forest conservation programs initiated and implemented locally by the stewards of the Bay - its private citizens.

This publication was developed under the direction of the Forestry Workgroup of the Chesapeake Bay Program's Nutrient Subcommittee. The Forestry Workgroup's mission is to coordinate, develop and implement plans and projects that focus on the importance of forest lands to restoring the health and productivity of the Chesapeake Bay watershed. Through this Workgroup, forest management and conservation expertise is brought to the Chesapeake Bay Program's committees and subcommittees. The Workgroup's objectives are to:

- ◆ Enhance communication and education regarding forests and forestry within the Bay watershed.
- ◆ Identify the need and opportunities for demonstration projects and program development.
- ◆ Promote the establishment and management of forests and trees to improve water quality and living resource habitats associated with the Bay and its tributaries.
- ◆ Promote forestry research and monitoring needed to evaluate the contribution of forests to the restoration of the Bay.
- ◆ Ensure that forest resource information pertinent to the Chesapeake Bay is available to those interested and/or involved in implementing Chesapeake Bay restoration efforts.

This document is intended for use as a resource for local organizations. It offers some excellent examples of what citizens and communities can do to enhance and wisely manage their forest resources. As of 1990, the entire Bay watershed had nearly 24 million acres, or about 59%, of its land in forest. Recent research indicates that as much as 47,000 acres of forest are being lost every year. We hope that this document helps to point out effective, and practical ways to reduce or reverse this trend, and how communities can play an important role in protecting and restoring forests for the Chesapeake Bay.

Sincerely,



Dr. John C. Barber
Chair, Forestry Workgroup

ACKNOWLEDGEMENTS

We gratefully acknowledge the many efforts of individuals at state and local governments and interested conservation groups across the watershed who did the work that resulted in the innovations described in this compendium. Our thanks also for their help in compiling the information. The case study descriptions were written by Lynn Stabenfeldt at the Metropolitan Washington Council of Governments in cooperation with the USDA Forest Service, Northeastern Area through the Chesapeake Bay Program Office in Annapolis, MD. Assistance with graphics was ably provided by Alexandra Gagnon.

For further information or to provide case studies for inclusion in future editions, contact:

Rick Cooksey or Albert Todd
USDA Forest Service
Northeastern Area State and Private Forestry
Chesapeake Bay Program
410 Severn Ave, Suite 109
Annapolis, MD 21403
1-800-968-7229

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Riparian Forest Conservation

City of Gaithersburg Comprehensive Environmental Guidelines

Gaithersburg, Maryland



KEY WORDS

- ✓ suburban
- ✓ development strategy
- ✓ environmental standards

Background

The City of Gaithersburg is located in the midst of the State of Maryland's technology corridor. Its proximity to the District of Columbia and outlying areas makes this suburban community a desirable place for both businesses and families to locate. As development pressures have increased over the years, the City's natural resources, particularly stream systems, have become increasingly stressed.

In 1994, the City moved to enhance existing development standards to maximize the protection of the City's natural resources. This action stemmed from a residential development proposal which, while meeting all City development standards, would have encroached upon an impaired stream. In response to citizen concerns, City Council directed staff to develop comprehensive environmental guidelines for development; in its directive, the Council expressed a commitment to the protection of natural resources throughout the development process.

At that time, the City had in place numerous, but separate, environmental ordinances including forest conservation, sediment and erosion control, storm water management, and floodplain management. While these ordinances provided some protection for the City's environmental and riparian resources, protection was fragmented.

Project Description

In December 1994, the City of Gaithersburg convened a committee of local professionals to work with City staff in the development of comprehensive environmental guidelines. Local developers, representatives of the Planning Commission and City Council, environmental consultants, regional and county environmental professionals, and City staff attended the bi-weekly committee meetings. Environmental guidelines developed in 1993 by the surrounding jurisdiction, Montgomery County, provided the basis for analysis of the City's existing guidelines. The County guidelines were selected as a model not only because of their comprehensive nature, but to also ease the development process for developers operating in both Montgomery County and the City of Gaithersburg.

The City of Gaithersburg modelled its environmental guidelines after Montgomery County's guidelines (the surrounding county) in an effort to ease the development process for developers operating in both jurisdictions.

Over a period of five months, the committee developed a draft guidance document entitled *City of Gaithersburg Environmental Guidelines*. Organized into two main sections, *Natural Resources Inventory (NRI)* and *Guidelines for Development*, the 47-page document is based on the principles of comprehensive watershed management but is more comprehensive in that it also relates to other important environmental concerns including:

- stream valley protection,
- limitations on increases in watershed imperviousness,
- upland and riparian forest resource protection, and
- wildlife corridor protection.

Natural Resources Inventory:

The NRI, required prior to development, is a complete analysis of existing natural resources and must contain specific information covering the development site and the first 100 feet of adjoining land or the width of the adjacent lot, whichever is less. Information pertaining to streams and drainage courses on or within 200 feet of the property must also be provided along with the off-site drainage areas for all streams entering the property. The *NRI* is submitted in map form along with any required narrative reports.

The careful attention given to existing stream systems during the *NRI* process will help the Planning Commission assess more carefully the potential impacts of proposed developments on these systems. (See Appendix A-1 for sample *NRI*.)

Guidelines for Development:

The *Guidelines for Development* attempt to address the problems and opportunities encountered in watershed development and identify management strategies designed to minimize adverse impacts. Among these management strategies are:

- the judicious application of land uses which allow for limiting impervious surfaces and maintaining wetlands, floodplains, seeps, and bogs in their natural condition;
- the establishment of protected slope areas which address slope gradient, soil erodibility, and proximity to stream channels;
- the use of stream buffers; and
- the provision of healthy forest and tree cover for the purpose of maintaining water quality, preserving wildlife habitat, preventing erosion, mitigating air pollution, controlling temperature, and enhancing community amenities in an urbanizing environment.

Project Impact

What began as a concern for inadequate protection of riparian buffer systems during the development process, resulted in the creation of comprehensive environmental guidelines for development in the City of Gaithersburg. Not only will stream corridors be protected, but so will other important natural resources including wildlife habitat. The guidelines, adopted as *Environmental Standards* in October 1995, set minimum standards for developers with the hope that even higher standards will be met.

Contact: Clark Wagner
Director of Current Planning
City of Gaithersburg
31 South Summit Avenue
Gaithersburg, MD 20877
(301) 258-6325

County-wide Riparian Forest Buffer Regulation



KEY WORDS

- ✓ urbanizing
- ✓ stream restoration
- ✓ regulation

Baltimore County, Maryland

Background

Baltimore City's three drinking water reservoirs, which are located primarily in Baltimore County, provide water to approximately 1.6 million people in the region each day. More than 2,000 miles of streams flow through County land, some captured by the drinking water reservoirs, the rest flowing on to tidal creeks and ultimately the Chesapeake Bay (see Appendix A-2 for map of Baltimore County watersheds and streams). In Baltimore County, protection of this valued resource is a high priority.

The County has developed a multi-faceted strategy for water resource management which includes the following:

- watershed management and planning,
- water quality monitoring,
- citizen education,
- volunteer stream restoration activities, and
- legislation.

Many of these activities are supported by a \$24 million, six-year capital program for stream restoration, stormwater retrofits, wetland creation, forest establishment, waterway cleanups, dredging, and shore erosion control.

Project Description

The retention and restoration of forest buffers are key elements of Baltimore County's effort to protect water quality, as articulated in their *Regulations for the Protection of Water Quality, Streams, Wetlands and Floodplains* (adopted in 1989 and codified in 1991):

The purpose of the Forest Buffer is to protect Baltimore County's streams, wetlands and floodplains; to protect the water quality of Baltimore County's watercourses, reservoirs, lakes and the Chesapeake Bay; to protect Baltimore County's riparian and aquatic ecosystems; and to provide environmentally sound use of Baltimore County's land resources.

** See Appendix A-3 to A-15 for copy of ordinance*

Baltimore County's riparian forest buffer regulations establish a clear link between water quality protection and riparian forest buffers.

The concepts contained in the regulation were developed over several years by the Baltimore Water Quality Steering Committee through a process of negotiation and consensus building. The Steering Committee included representatives from the engineering, home building and environmental communities, as well as representatives of County agencies.

The regulation intends that riparian areas be left undisturbed to encourage regeneration or continued growth of existing vegetation. Establishment of forested buffers next to all perennial and intermittent streams is required for new development. Post-construction, forested buffers are protected through delineation on record plats.

A feature of the regulation is the flexibility applied to calculation of buffer widths; widths are determined using stream classification and slope, as summarized in the table below.

Percent Slope	Width Of Forest Buffer (ft)	
	Class I Stream	Class III, IV Stream
18	80	100
19	90	100
20	100	100
21	110	110
22	120	120
23	130	130
24	140	140
25	150	150
Maryland Water Use Classes and Standards: Class I - primary contact recreation; Class II - protection & propagation shellfish harvesting waters; Class III - protection & propagation of natural trout waters and their associated food organisms; Class IV - recreational trout waters (there are no Class II streams in Baltimore County).		

The legislation requires that all new development establish riparian forest buffers and that management activities for existing buffers, including restrictions on disturbance of existing vegetation and soil, be strictly followed.

The regulations provide not only for the establishment of riparian forest buffers, but also for their management. Management requirements for established forest buffers restrict activities that would impair the ecological health of the system, including:

- disturbance of existing vegetation,
- disturbance of soil,
- pesticide use, and
- motorized vehicle use.

Also, planting of the forest buffer may be required in areas where channel erosion, stream pollution or habitat degradation exists.

Project Impact

The County regulation has proven to be a model initiative for the preservation of riparian forests and the protection of water quality. Because the regulation applies to all Baltimore County streams, protection of the ecological health of the County's stream systems is better insured. The County is currently tracking the effectiveness of the riparian forest buffer regulation using a resources database for land development projects which is reviewed by the Department of Environmental Protection and Resource Management.

Contact: Donald C. Outen
Baltimore County
Department of Environmental Protection and
Resource Management
401 Bosley Avenue
Towson, MD 21204
(410) 887-5683

Donegal Creek Restoration Project

Lancaster County, Pennsylvania



KEY WORDS

- ✓ agricultural use
- ✓ fish habitat restoration
- ✓ cooperative partnership

Background

The Lancaster County Conservation District and the Donegal Fish and Conservation Association have formed a cooperative "Partnership" for the purpose of restoring Donegal Creek, a limestone trout stream located in the northwest corner of Lancaster County. Once a favorite stream of local fishermen, intensive agricultural practices on surrounding lands have severely degraded this aquatic habitat. Streambank erosion and excessive nutrient levels have impaired the stream system and, for more than 30 years, trout have not returned to Donegal Creek to spawn. A primary objective of the restoration effort is to re-establish Donegal Creek as a healthy, thriving trout stream.

Success of the Donegal Creek Restoration Project depends in large part on the cooperation of local landowners. Properties owned by 23 individuals line the 6.67 mile stream segment that has been targeted for restoration. On many of these properties, cattle operations are common. Unrestricted cattle access to the stream has contributed significantly to its degraded condition. The Partnership is also concerned with the lack of native vegetation, a sediment-laden substrate, and a wide, shallow channel due to various forms of accelerated erosion and resulting sedimentation.

Unrestricted cattle access to the stream has contributed significantly to its degraded condition.

A Partnership Memorandum of Understanding (1994) clearly defined partner roles, responsibilities, and procedures for coordinating project implementation. According to this agreement, the Conservation District will oversee permitting, design work, and administrative funding in support of the project; the Conservation Association will provide the necessary labor for project implementation. The Alliance for the Chesapeake Bay has helped with recruitment of volunteers for planting projects.

Project Description

The Partnership has identified a stream restoration approach that will reduce the impacts of agricultural practices on the stream system and encourage re-establishment of the trout population. This approach comprises two phases: education of landowners and implementation of stream restoration projects.

Education of Landowners:

Conservation District staff initiated the project with a landowner educational program. The program consisted of 1) a survey designed to assess landowner knowledge of the stress that agricultural runoff places on stream systems, and 2) workshops designed to educate the landowners about the adverse impacts of agricultural runoff on the local stream, the stress that unregulated cattle access places on the system, and the subsequent impacts on the trout population.

Conservation District staff made personal visits to the landowners, and worked with them to assess the property immediately adjacent to Donegal Creek and to identify enhancement projects that could provide long-term benefits for both Donegal Creek and their individual agricultural practices. The educational efforts have paid off; at present, 19 of the 23 landowners have agreed to participate in the Donegal Creek Restoration Project.

The Partnership continues to work with the remaining landowners to gain their support for the project. In that effort, a "Demonstration Fence" used to limit cattle access to Donegal Creek has been built along a highly visible and well travelled segment of the Creek's mainstem. The Partnership hopes that the "Demonstration Fence" will convince concerned landowners that these fences are structurally sound.

Stream Restoration Projects:

The Partnership has identified a number of stream restoration projects that will help restore Donegal Creek to a healthy trout stream which are:

- stream bank fencing and cattle crossings,
- fish enhancement structures,
- streambank stabilization, and
- riparian buffer strips.

Success of the overall effort is largely dependant upon limiting cattle access to the stream. Comparison of a wooded segment to a pastured segment where cattle are allowed free stream access, clearly demonstrated that the cattle contributed considerably to stream degradation. Along the wooded segment near the headwaters of the west branch, the stream width at water level measured 12 feet and had an average depth of 11 inches. Stream width and depth changed dramatically 100 feet downstream of the wooded site where pasture land dominated. At this point, stream width increased to 24 feet, with a corresponding decrease in average depth to four inches.

The Partnership estimates that more than 25,000 seedlings will be needed to establish a contiguous riparian forest buffer along Donegal Creek.

Stream Bank Fencing and Cattle Crossings. A priority for the Partnership is limiting cattle access to Donegal Creek; stream bank fencing and cattle crossings will be used in this effort. The project partners are targeting 15 cattle pastures for stream bank fencing - two of those sites have already been fenced with donated materials. In the future, the Soil and Water Conservation District's tree seedling sale and moneys from a 319 grant will be used to install fencing. Fencing maintenance will be supplied free of charge by the Partnership. Minimally, the fences will be placed a distance of 10 feet from the stream.

Stone ford cattle crossings will also be designed and installed by the Partnership. It is anticipated that one crossing will be installed per 1,000 feet of fenced stream corridor. Once stream bank fencing is in place, the practicality of and need for other restoration projects is considered

Fish Enhancement Structures. A number of in-stream structures have been identified to help trout negotiate Donegal Creek as they swim upstream during spawning season. In-stream habitat projects that restore channel dimensions and flow patterns, such as rock frame and log frame deflectors, porcupine deflectors, Jack Dams, slat fish houses, and half-log houses will be used in this effort. Replacement of large boulders will also take place.

Streambank Stabilization. Stabilization of eroded streambanks is needed along most of Donegal Creek. Techniques identified for this purpose include bio-engineering, rip-rap, mud sill installation, porcupine, rock frame and log deflectors.

Riparian Buffer Strips. Riparian reforestation will occur at all sites along Donegal Creek where it is deemed appropriate and necessary. To date, riparian buffer plantings have taken place at three sites; more than 3,000 trees were planted in Spring 1994 in this effort. The Partnership estimates that more than 25,000 seedlings will be needed to establish a contiguous riparian forest buffer along Donegal Creek.

Project Impact

The Donegal Creek Restoration Project has united local government, a non-profit group, local citizens, and private landowners in an effort to restore a degraded trout stream. Re-establishing a contiguous riparian forest buffer is an important component of the Partnership's restoration work. With hard work and perseverance, the efforts of the community partnership will be rewarded as this riparian forest system is restored, resulting ultimately in the return of trout in large numbers to Donegal Creek.

Project Partners

Project partners include the Pennsylvania Fish and Boat Commission, Chesapeake Bay Foundation, Alliance for the Chesapeake Bay, PACD and Pennsylvania Department of Environmental Resources - Bureau of Forestry, USDA Forest Service - Northeastern Area.

Contact: Mark Metzler
Lancaster County Conservation District
1383 Arcadia Road
Lancaster, PA 17601-3149
(717) 299-5361

Geographic Information System: Riparian Restoration Analysis Initiative

Annandale, Virginia



KEY WORDS

- ✓ regional approach
- ✓ GIS technologies
- ✓ restoration analysis

Background

The Northern Virginia Planning District Commission (NVPDC) is a public agency engaged in a wide variety of regional planning, coordination, and technical assistance activities in support of 13 local governments within the Virginia portion of the Washington, D.C., metropolitan area. NVPDC's program areas include demographics and economic analysis, legislative services, and planning and environmental services. The planning and environmental services program supports member government implementation of Chesapeake Bay protection measures.

Rapid urbanization has placed stress on riparian systems throughout NVPDC's planning area. Many member jurisdictions have responded by developing local ordinances and programs that enhance riparian areas. These include Loudon County's Scenic Creek Valley Buffer Ordinance and Fairfax County's riparian restoration project in the Difficult Run watershed. While these efforts are important and have contributed to the overall health of riparian systems in the region, NVPDC recognized the need for a coordinated regional effort that would promote re-establishment of priority riparian buffer segments in Northern Virginia.

The Northern Virginia Planning District Commission is using GIS to develop a regional riparian buffer restoration strategy.

Project Description

NVPDC initiated the *Riparian Restoration Analysis Initiative* in 1993. The *Initiative* uses aerial photography to identify impaired buffer systems and then analyzes them for restoration potential. All riparian segments within NVPDC's planning boundaries are being considered for restoration potential including the tidal portions of the Potomac River. The two-phase study was designed to support Chesapeake Bay program initiatives.

Phase I:

Review of 1993 aerial photographs provided baseline data for Phase I analyses. Stream segments were defined as "buffer impaired" when review of these photographs indicated limited, or complete absence of, woody vegetative cover apparent within a 100-foot buffer around stream segments. The 100-foot buffer is based on the State of Virginia's *Chesapeake Bay Preservation Area Designation and Management Regulations* which require the establishment of

a buffer not less than 100 feet in width adjacent to Resource Protection Areas (tidal wetlands, nontidal wetlands connected by surface flow and contiguous to tidal wetlands or tributary streams, and tidal shores). In some cases, stream segments were examined beyond locally designated RPAs.

This information was then used to create the *Buffer Impaired Stream Segments in the Northern Virginia Coastal Zone* map (see Appendix A-16 for example of map). Using a base map created from the U.S. Geological Survey 1:100,000 scale topographical map series, the "buffer impaired" areas were identified for NVPDC's planning area. The map is intended to provide a primarily subjective guide for identification of potential target sites for reforestation and other revegetation activities.

Phase II:

Phase II efforts include digitization of the buffer impaired stream segments map for use with NVPDC's GIS system. Following digitization, buffer impaired stream segments will be overlaid with land use data already on NVPDC's GIS. Those areas with the greatest potential for buffer restoration will be identified and mapped. This information will then be distributed to Northern Virginia localities and local organizations involved in riparian restoration efforts. Phase II is underway with an anticipated project completion date of June 1996.

Project Impact

NVPDC's *Riparian Restoration Analysis Initiative* will help localities and local organizations identify riparian restoration and reforestation sites that will enhance Chesapeake Bay restoration efforts both locally and on a regional scale.

Project Partners

Funding to support the *Riparian Restoration Analysis Initiative* was provided by the Virginia Department of Environmental Quality's (DEQ) Coastal Resources Management Program. NVPDC receives annual support for its Coastal Management Program from a DEQ technical assistance grant. The *Riparian Restoration Analysis Initiative* is part of NVPDC's ongoing technical assistance activities and was included in NVPDC's 1993 and 1995 grant applications.

Contact: David Bulova
Coastal and Chesapeake Bay Program Manager
Northern Virginia District Planning Commission
7535 Little River Turnpike
Annandale, VA 22003
(703) 642-0700

Hampshire County Riparian Task Force

Hampshire County, West Virginia



KEY WORDS

- ✓ rural
- ✓ education & outreach
- ✓ demonstration sites

Background

Clean, free-flowing streams are an integral part of Hampshire County's heritage. They provide recreational opportunities for locals and visitors and are the primary drinking water source for many residents. Development pressures and expanding agricultural practices increasingly threaten this resource. Water from Hampshire County and the surrounding seven counties drains into the North and South Branches of the Potomac River, a major tributary of the Chesapeake Bay. By 1990, human activities had resulted in an estimated 35 percent loss of the County's streamside vegetation.

In 1992, the Hampshire County Riparian Task Force was convened. Comprised of landowners and twelve local organizations, the Task Force has subsequently dedicated itself to educating the general public about the important role that forested riparian buffers play in maintaining water quality. An important part of the Task Force message is that individual actions and personal choices can have lasting effects, both good and bad, on the region's water resources. Committed to reaching as large an audience as possible, the Task Force developed an educational strategy that targets both children and adults.

Committee membership includes representatives from the Division of Natural Resources (fisheries), Division of Forestry, Natural Resources Conservation Service (formerly the Soil Conservation Service), Extension Homemakers, Pine Cabin Run Ecological Lab, County Planning Commission, Consolidated Farm Services Agency (formerly the Agricultural Stabilization Conservation Service), West Virginia University Extension Service, US Forest Service, Westvaco, Potomac Valley Soil and Water Conservation District, and the Potomac Headwaters Resource, Conservation and Development Council. The committee rapidly began to take on a regional focus as several members are assigned to the eight-county area.

The Task Force has dedicated itself to educating the general public about the important role that forested riparian buffers play in maintaining water quality.

Project Description

The Hampshire County Riparian Task Force developed educational materials and demonstration sites to promote the importance of protecting water quality in the Potomac River Basin. To date, the Task Force has:

- developed a recycled paper placemat with illustrations of healthy and degraded riparian habitats;
- developed a brochure that explains how agricultural, forest, and development activities contribute to degraded water quality; and
- established four riparian buffer demonstration sites that demonstrate how streams benefit from healthy riparian buffers.

Riparian Forest Buffer Placemat:

The riparian forest buffer placemat has proved an invaluable educational tool for school students throughout the eight-county region. By contrasting a healthy riparian habitat with a degraded one, the placemat demonstrates the inherent value of a wooded riparian buffer: clean water, abundant wildlife, lush vegetation, and fish. In contrast, the stream segment adjacent to an agricultural operation with no riparian buffer is characterized by dirty water, eroded stream banks, and dead fish. The placemat has been distributed to 4th graders attending public schools throughout the region, by local restaurants and at Earth Day events (see Appendix A-17 for example of placemat).

This educational tool has challenged children to think about their relationship to the environment and has helped them understand the important role that forested riparian buffers play in protecting water quality. An added benefit is that the children may share this information with their parents, in turn teaching them of the importance of forested riparian buffers.

Riparian Brochure:

The Task Force also developed a four-panel brochure highlighting forestry, agricultural, and land development best management practices (BMPs) that minimize degradation of riparian buffers. Photographs contrasting BMPs with no management practices for each of the three land uses visually enhance this educational tool (see Appendix A-18 to A-19 for copy of brochure).

Riparian Buffer Demonstration Sites:

To supplement the printed educational materials, the Task Force has established four riparian buffer demonstration sites. All sites are fenced and planted with native seedlings. One demonstration site is simply a fenced wooded area in pristine condition, providing a visual demonstration of how a healthy riparian zone functions.

Development and distribution of a placemat that depicts both a healthy riparian habitat and a degraded one has proven an important educational tool for 4th graders.

Project Impact

The Hampshire County Riparian Task Force has reached beyond County borders and brought agencies together in a collective effort to highlight the critical link between healthy riparian buffers and good water quality. In that effort, the Task Force distributed 35,000 color and 10,000 black and white copies of the original placemat in three counties. Another 1,400 copies were laminated with plastic for permanent use.

Other significant projects including the brochure and demonstration sites are in place as a result of the successful placemat effort. The brochure was distributed to more than 35,000 landowners in eight counties. Four demonstration sites were also established. Through projects and activities, the Task Force's educational program has reached an estimated 80,000 citizens of the region. The important role of riparian forest buffers in protecting water quality was emphasized throughout the effort. The Task Force hopes that the work done in Hampshire County will be the start of a statewide effort to educate the public about the value of riparian habitats.

Project Partners

Support for Task Force activities include funding from West Virginia Education Grants, West Virginia Extended Service Grants, U.S. Forest Service, and Potomac Headwaters RC&D.

Contact: Roger Boyer, Coordinator
Potomac Headwaters RC&D Council
1446-2 Edwin Miller Boulevard
Martinsburg, WV 25401-3737
(304) 267-8953

Headwaters of the Shenandoah River: Riparian Easement Program

Augusta County, Virginia



KEY WORDS

- ✓ farmland protection
- ✓ conservation easement
- ✓ resource management

Background

The American Farmland Trust noted in a recent report entitled "Farming on the Edge", the urgent farmland preservation needs in the Shenandoah Valley and other agricultural powerhouses of the nation. The valley was identified as an area where extremely productive farmland coincides with population growth far above national rates. With this in mind, protection of riparian zones in the Shenandoah River Valley is essential to minimizing water quality impacts from agricultural and other land uses.

In response to these concerns, the Headwaters Soil and Water Conservation District (Headwaters SWCD) developed a voluntary easement program that targets agricultural riparian zones in the Shenandoah Valley. (An easement is a legal agreement in which the landowner retains ownership and full control of the property, yet conveys specified rights to the holder of the easement.) It is the first riparian easement program in the State of Virginia. Through this program, the Headwaters SWCD is working with local citizens to repair, maintain, and protect forested riparian buffers to benefit present and future generations.

Project Description

The Headwaters SWCD Riparian Easement Program began in 1993. Landowners participating in the Riparian Easement Program agree to place easements on their properties which limit their rights to alter the riparian zone. They also agree to work with Headwaters SWCD, the easement holder, to develop a management plan that ensures protection of the riparian zone. Typically, this is done by establishing and maintaining vegetation and limiting livestock access to the stream. Each easement is tailored to the property and the desires of the individual landowner.

In 1993, the first conservation easement was placed on 4.18 acres abutting the Middle River. Through the easement, the Headwaters SWCD gains assurance that the landowner's streambank will be maintained according to a management plan drawn up and agreed to by both parties. The primary objective of the

While many easements can take up to a year to establish, the Headwaters SWCD has streamlined the process - enrollment in the Headwaters Riparian Easement Program takes just 30 days.

management plan is to maintain streambank vegetation. To achieve this objective, the management plan specifies that cattle must either be given controlled access to the creek or an alternative water source. The management plan further specifies that the landowner maintain fencing and implement sound practices of soil, water, timber, and wildlife resource management. Additionally, no construction activities are allowed in the riparian zone, except for a picnic shelter.

A clear description of the easement zone is an important part of the Riparian Easement Program. The description gives exact acreage for federal and local tax deductions due the landowner. Additionally, the description helps the easement holder and landowner understand where the zone is and, subsequently, to what areas the management plan applies (see Appendix A-20 to A-27 for sample conservation easement).

While many easements can take up to a year to establish, the Headwaters SWCD has streamlined the process - enrollment in the Headwaters Riparian Easement Program takes just 30 days. This has resulted in increased levels of interest from landowners who are unwilling to devote a year's time (the amount of time that it typically takes to establish an easement) towards easement establishment.

Project Impact

The Headwaters SWCD Riparian Easement Program has been in place for two years, with very positive results. Since 1993, five easements have been established in three counties of the Shenandoah region. The establishment and protection of vegetated riparian zones contribute significantly to the overall effort. Over time, benefits will be increased further if easements are placed on consecutive parcels, resulting in the establishment of riparian buffer corridors.

Contact: Robert Whitescarver
Natural Resources Conservation Service
Augusta County Government Center
P.O. Box 70
Verona, VA 24482-0070
(540) 248-4328

Herring Run Watershed Association

Baltimore, Maryland



KEY WORDS

- ✓ citizen volunteers
- ✓ education & outreach
- ✓ stream teams
- ✓ tree nursery program

Background

The Herring Run Watershed Association (HRWA), a grassroots, volunteer-based environmental group was formed in January 1993 after a stream survey of the Herring Run and its major tributaries was conducted by citizen volunteers. These volunteers found that much work was needed to restore this urban stream. Notable problems identified in the survey included sewage overflow points, fish migration barriers, and poor riparian conditions.

A primary goal of the Herring Run Watershed Association is to improve water quality in the Herring Run and Chesapeake Bay. It is the Association's hope to restore the herring fishery before the turn of the Century. The 25-mile stream system runs through both Baltimore City and County. Its watershed is 45 square miles and contains 120 communities, 80 schools, and 65 churches.

The large human population in the Herring Run watershed has placed significant stress on this ecosystem and has influenced the direction that the Association's restoration efforts have taken. Initially, the Association functioned primarily as a group of volunteers that worked together on stream cleanups and tree plantings. Over time, however, Association members realized that a strong education and outreach program would more effectively promote their goal of improved water quality in the Herring Run because such a program would reach a large audience, resulting in increased community involvement in the HRWA's stream restoration projects.

The HRWA has successfully implemented a number of stream restoration and public education/outreach projects in this effort. These include community stream teams, stream and watershed surveys, water quality monitoring, stream cleanups, and a quarterly newspaper highlighting what schools are doing to help the Herring Run. A successful walkathon and festival to build community support was held in 1995 - more than 1,500 people attended.

For the past year, the Herring Run Watershed Association has been working with the Department of Natural Resources' TREE-MENDOUS MARYLAND and the Chesapeake Bay Foundation on a major educational and reforestation effort in the Herring Run watershed.

In 1995, HRWA initiated a tree nursery program that will provide free trees to watershed community groups for local tree plantings.

Project Description

In 1995, the Herring Run Watershed Association initiated a tree nursery program. The nursery program, run in cooperation with TREE-MENDOUS Maryland, the National Tree Trust, the Baltimore Municipal Golf Corporation (BMGC) and the Baltimore City Department of Recreation and Parks, will provide free trees to watershed community groups committed to restoration of the Herring Run watershed.

A key aspect of the nursery program is the unique relationship between HRWA and the BMGC: golf corporation staff care for the trees and the HRWA provides administrative support for the program. The tree nursery program is structured as follows:

- 1) Seedlings from the National Tree Trust program are provided to the BMGC by TREE-MENDOUS Maryland.
- 2) The BMGC maintenance crew pots, weeds, and waters the seedlings with assistance from HRWA volunteers.
- 3) HRWA promotes the availability of free trees for Herring Run watershed plantings, all of which occur on public lands.
- 4) HRWA maintains an inventory and manages the distribution of trees.
- 5) HRWA advises communities about the suitability of trees for specific areas.

In 1996, HRWA's tree nursery program will provide more than 600 trees to neighborhood groups.

HRWA has also established a tree planting program which provides the education and tools needed for successful tree plantings. Mulch and special watering systems are provided to support these volunteer planting projects.

Project Impact

As designed, the year-old tree nursery program will provide numerous benefits both to the Herring Run watershed and the community that lives there. Through this program and other reforestation efforts, 25 acres of riparian forest buffer will be re-established; this year alone, more than 600 trees will be distributed to neighborhood groups committed to restoring the health of the watershed. Citizen groups receiving trees will be informed of the values of trees, planting and maintenance techniques, and watershed management.

The HRWA nursery and tree planting programs are designed to promote citizen-based restoration of the Herring Run. These programs encourage watershed residents to become actively involved in restoring the resource by providing them with the knowledge and tools necessary to become environmental stewards.

Project Partners

The Herring Run Watershed Association's efforts have been supported by the following organizations: Chesapeake Bay Program; Chesapeake Bay Foundation; National Tree Trust; Maryland Department of Natural Resources (TREE-MENDOUS Maryland); Maryland Save Our Streams; Baltimore Municipal Golf Corporation; Baltimore City Department of Recreation and Parks; and the U.S. Forest Service.

Contact: Lynn Kramer
Herring Run Watershed Association
P.O. Box 5591
Baltimore, MD 21285
(410) 668-3626

Resource Protection Overlay Zone

Charles County, Maryland



KEY WORDS

Background

The Charles County Comprehensive Plan Citizen's Advisory Committee, consisting of 65 members representing both residential and business interests, identified protection of stream valleys and natural resources as an issue to be addressed in the 1990 County Comprehensive Plan. To achieve this goal, several objectives were established, including the "adoption and enforcement of development performance standards to protect sensitive areas and environmental features and the establishment of a stream valley protection and acquisition program." The goal of stream valley protection and protection of associated sensitive areas was achieved with the implementation of a *Resource Protection Overlay Zone (RPZ)*, included in the revised County Zoning Ordinance that was enacted in 1992.

- ✓ suburban/rural
- ✓ resource mapping
- ✓ county zoning ordinance
- ✓ environmental standards
- ✓ flexible guidelines

Project Description

The overlay zone for major stream valleys/corridors is superimposed on the County zoning maps. Its location corresponds with the location of all stream valleys/corridors in the County and incorporates adjacent sensitive areas including floodplains, non-tidal wetlands, steep slopes, and habitat areas associated with stream valleys. Performance standards for protection of these sensitive areas are defined in the County Zoning Ordinance. All new development activities are required to comply with *RPZ* guidelines.

The primary goal of the *RPZ* is to protect water quality. Towards this goal, the removal of vegetation is prohibited and disturbances to streambeds are to be minimized in the *RPZ*. Within the *RPZ*, compliance with a combination of performance standards and established buffer widths based on stream order is required. First and second order streams are required to provide a 50-foot-minimum buffer width while third and fourth order streams are protected by a 100-foot-minimum buffer. The minimum buffer is extended outward to include all adjacent 100-year floodplains, adjacent non-tidal wetlands or wetlands within 25 feet, and steep slopes greater than 15 percent adjacent to the buffer. In the case of adjustment for steep slopes, the buffer is expanded to the top of the slope or is doubled, whichever is less (see Appendix A-28 for sample *RPZ* delineation).

Since Charles County adopted the RPZ, public officials, the development community, and citizens have become increasingly aware of the important role that riparian buffers play in enhancing stream systems.

Several uses are permitted in the buffer, provided that certain conditions have been met and that the *RPZ* is not compromised. Agricultural uses are permitted contingent upon an approved soil conservation and water quality plan. Timber harvesting is also permitted provided the harvesting is conducted in conformance with forest conservation practices outlined in the *Annotated Code of Maryland*. Utility transmission lines, recreational access, and non-motorized trails are permitted in the buffer subject to compliance with the following performance criteria:

- Project location in the *RPZ* is essential for access or continuity and no reasonable alternatives exist.
- Crossings of the *RPZ* are as close to 90 degrees as reasonably possible.
- The project complies with the requirements of the U.S. Army Corps of Engineers, Maryland Department of Natural Resources, and the Charles County Floodplain Management Ordinance.
- The project is designed to minimize disturbances associated with clearing and grading practices.
- Approved sedimentation and erosion control, best management practices, and re-vegetation plans are implemented for the project.
- The habitats of Federal or State listed threatened and endangered species or other critical habitats are fully protected.

During the first two years of *RPZ* requirement implementation, the County found it necessary to provide a more comprehensive definition of a stream and to establish policy regarding the location of lot boundaries outside the *RPZ* area. The definition of a stream now contains criteria for surface flow and water originating from a groundwater source during a portion of the year. In cluster subdivisions with lots ranging from 15,000 to 30,000 square feet, an amendment was proposed requiring that development be located outside the *RPZ* (lots greater than 40,000 square feet in size are excluded from this requirement). This measure was taken to protect the integrity of the buffer and to guard against the possible loss of function if the buffer was encroached upon by development.

Project Impact

Implementation of the *RPZ* requirements has resulted in greater protection of stream valleys and associated sensitive areas through better subdivision design and management of public facility location. For example, the siting of stormwater management facilities outside the *RPZ* results in improved water quality while maintaining streambed integrity. Protection of forested buffers is an important aspect of the County's stream valley and water quality protection efforts. The County's Forest Conservation Ordinance identifies forested *RPZ*

areas as a high priority for retention and protection through conservation easements. Since the program's inception, public officials, the development community, and citizens have become increasingly aware of the important role that forested buffers play in enhancing stream systems. RPZ designation on final plats has also assisted in notification of a stream's resource value to current and future property owners.

Contact: Patricia Haddon
Charles County Office of Planning and Growth Management
Charles County Government Building
P.O. Box B
La Plata, MD 20646
(301) 645-0540

Riparian Greenway System

City of Newport News, Virginia



KEY WORDS

- ✓ urban
- ✓ greenway preservation
- ✓ Comprehensive Plan

Background

Pressures from urbanization have prompted communities throughout the Chesapeake Bay watershed to acknowledge the importance of greenway systems in their communities. Today, many local governments include greenway, stream corridor, and open space language in their discussion of long range goals. Without strong programmatic or regulatory backing, however, goals of greenway preservation are seldom achieved.

In November 1993, the City of Newport News, Virginia, established programmatic backing for its greenway system. At that time, the Newport News City Council adopted the City's new Comprehensive Plan, the *Framework for the Future*. A unique aspect of the plan is that it features a future vision of the City's riparian greenway system on the Comprehensive Plan Map.

Project Description

By placing the City's riparian greenway system on the Comprehensive Plan Map, the City has committed to the establishment of this greenway over time. Elements identified on the Framework's Comprehensive Plan Map (e.g. the greenway system) must be addressed in master plans for development proposals that require zoning changes or conditional use permits. Development proposals are expected to accommodate the Comprehensive Plan Map elements in the overall design. Historically, this approach has been used to protect rights-of-way for future roads, parks, schools and other necessary public facilities. Under the City's new program, this same approach is applied to riparian greenways.

Previously acquired greenway property and easements provide the basis for the City Greenway Plan. A number of stream segments are already protected and additional sections will be added to the system as developments are proposed or expanded. The system is 10 percent complete at present and is anticipated to grow approximately 10 percent per year during the coming decade.

Expansion of the greenway network will occur primarily through easements, both donated and purchased, which will be administered by the Urban Conservancy Program within the Department of Planning and Development. The Department of Parks and Recreation will develop and manage public access

In 1993, the City of Newport News committed to the establishment of a riparian greenway system by depicting this system on its Comprehensive Plan Map.

facilities. Physical improvements for public access to the riparian greenway system have been and will continue to be funded by a variety of sources including the general fund, bonds, and grants from state and federal agencies.

The City Greenway Plan currently includes two established greenway systems: Slater's Creek Greenway and Stony Run Creek Greenway. The Slater's Creek Greenway, established by purchase, is now being developed for public access as part of the City's Waterfront Parks Master Plan. This greenway includes more than 7,000 linear feet of the stream and its banks. Plans for access facilities along the Stony Run Creek Greenway, in the northern portion of Newport News, are currently being designed by the Department of Planning and Development.

Project Impact

The City anticipates several benefits from its riparian greenway system, including the following:

- neighborhood beautification,
- an improved recreational system with linear connections developed between parks, and
- increased opportunities for nature study.

The system will also contribute to the ecological health of the James River and Chesapeake Bay.

Contact: Paul F. Miller, Director
Department of Planning and Development
2400 Washington Avenue
Newport News, VA 23607
(804) 247-8428

Scenic Creek Valley Buffer Ordinance

Loudon County, Virginia



KEY WORDS

- ✓ citizen action
- ✓ zoning ordinance
- ✓ stream buffer protection

County citizens were instrumental in gaining support for the "Scenic Creek Valley Buffer Ordinance". The end result of their efforts, which included provision of riparian buffer educational programs to the public and County officials, was adoption of the ordinance by County officials in 1994.

Background

In 1989, Loudon County officials began work on a new comprehensive plan aimed at managing growth in the east while preserving the more rural, mountainous, and agricultural western half of the County. This strategy developed from concerns with the rapid rate at which Washington suburbs were spreading into the County. The 520-square-mile County is home to, among other things, the Dulles International Airport. According to 1990 census data, its estimated population is 102,100, a figure which grew by 50 percent in the 1980s and continues to grow 5 percent per year.

The new Comprehensive Plan (adopted in 1991) recognized the need for provisions in the zoning ordinance that protect both the scenic nature and water quality of County streams and led to a proposed zoning ordinance revision. The proposed ordinance included protection for "scenic creek valley overlay districts". Those, in effect, would be special zoning districts that would affect land 300 feet from the banks of all streams that drain more than 640 acres, or one square mile.

The push for a zoning ordinance revision came to a halt shortly after the 1992 election; the election changed the makeup of the County Board of Supervisors and resulted in a dramatic shakeup of the Planning Commission. In 1993, eight of the Commission's nine members were replaced. It appeared that the new Commissioners would scrap the buffer provision altogether because they felt the 300-foot buffer identified in the overlay district was excessive. In response to this threat, concerned citizens provided educational programs to County officials and citizens to promote and gain support for the "scenic creek valley buffer" ordinance. The ordinance was adopted in 1994.

Project Description

The intent of Loudon County's Scenic Creek Valley Buffer Ordinance (see Appendix A-29 to A-30 for sample ordinance) is to:

- promote water quality and the preservation of significant environmental resource areas, wildlife habitat and corridors, and native vegetation areas;

- protect and enhance water and groundwater recharge processes by protecting the natural capacity of vegetative areas along rivers and creeks to filter and purify storm water runoff;
- protect aquatic environments from the warming effects of solar radiation by preserving riparian tree canopy cover;
- promote tourism and high quality corporate investment by maintaining, to the extent reasonably possible, existing high water quality;
- maintain the scenic beauty of the streams of Loudon County; and
- implement the Comprehensive Plan.

The Scenic Creek Valley Buffer prohibits construction activities in areas adjacent to scenic rivers and major stream areas draining greater than 640 acres, or one square mile (see Appendix A-31 for map). Measured from the stream bank, the ordinance requires stream buffers as follows:

- 250 feet along the Potomac River;
- 200 feet along the County's two state-designated scenic rivers, Goose Creek and Catoctin Creek; and
- 150 feet along other County streams.

A feature of the ordinance is the flexibility it affords to the calculation of buffer widths; reductions of up to 100 feet are permitted provided stormwater best management practices are used or if streamside forests are either preserved or planted. The ordinance, which applies to all new subdivisions, allows developers to transfer development densities from areas within the buffer to other parts of the same development tract.

Project Impact

Loudon County's "scenic creek valley buffer" ordinance is an example of citizen-government cooperation and action. Citizens and local government were able to agree upon a plan to protect many of the County's waterways before they were surrounded by development.

Contact: Irish Granfield
Loudon County Department of Planning
750 Miller Drive, SE
Suite 800
Leesburg, VA 22075
(703) 777-0164

Small Habitat Improvement Program in Urban Areas

Washington, D.C.



KEY WORDS

- ✓ citizen volunteers
- ✓ adopt-a-neighborhood
- ✓ urban stream restoration

Background

The Small Habitat Improvement Program (SHIP) was established in 1990 by the Anacostia Watershed Restoration Committee (AWRC) as a pilot program to package small-scale environmental restoration projects for citizens and volunteers. The SHIP provides opportunities for Anacostia watershed residents in the District of Columbia, Prince George's and Montgomery counties to actively participate in local stream restoration efforts. Public education, outreach, and restoration projects implemented at the local level are key components of this program. The re-establishment of streams as a community resource, particularly in neighborhoods where streams have become severely degraded, is an important objective of the program.

In 1994, the Metropolitan Washington Council of Governments (MWCOG) joined the U.S. Environmental Protection Agency, the Corporation for National Service, and a local service corps to implement SHIP projects in the District of Columbia portion of the watershed. MWCOG designed and coordinated the project which was implemented at the neighborhood level by AmeriCorps members. AmeriCorps is a federal initiative that aims to engage all citizens, but particularly young people, in meeting unmet needs in communities across the United States. Other project partners included federal and local government agencies, citizens groups, schools, and non-profit organizations as follows:

- District of Columbia's - Environmental Regulation Administration, Planning Agency, Department of Public Works, Department of Recreation and Parks, and Fisheries Program;
- American Rivers;
- Garden Resources of Washington;
- Earth Conservation Corps;
- US Department of Agriculture's Soil Conservation Service; and
- Cook, Backus, and Birney Elementary schools.

Working in a cooperative effort, the SHIP was implemented in one of the more economically depressed and environmentally degraded subwatersheds - Watts Branch (see Appendix A-32 for map). SHIP projects implemented included

The re-establishment of streams as a community resource is an important objective of the Small Habitat Improvement Program.

reforestation projects, wetland plantings, stormdrain stenciling, and stream cleanups. A key component of the program was a stream valley park restoration project that included a series of tree plantings, resulting in the establishment of nearly two linear miles of riparian buffer.

Project Description

The program began with an intensive environmental education program in which AmeriCorps members (Corps members) learned about the important link between healthy streams and riparian buffer systems. The educational program emphasized the important role that healthy trees and riparian buffers play in an urban environment. Through the educational sessions, Corps members developed the knowledge and skills needed to accomplish restoration projects and outreach activities in the community.

Outreach activities and restoration efforts were closely linked throughout the program. Corps members conducted tree plantings at local schools and interacted with the Watts Branch community through project *Adopt-a-Neighborhood* which was designed to enhance implementation of stream restoration work at the neighborhood level. The following steps comprise project *Adopt-a-Neighborhood*:

- identify geographical boundaries of a neighborhood,
- assess neighborhood for project potential (reforestation, stormdrain stenciling, stream cleanup, education and outreach, etc.),
- develop action plan, and
- implement action plan.

This organizational structure allowed AmeriCorps members to make a thorough and demonstrable difference in a sub-section of the Watts Branch subwatershed before moving to another neighborhood. Within the framework of this project, Corps members made significant contributions to the watershed community at the neighborhood level by providing education and outreach to area residents, stenciling stormdrains, and planting trees along denuded sections of the stream. The larger subwatershed community also benefitted from a series of tree plantings which resulted in the re-establishment of forested buffers along Watts Branch.

Project Impact

During the nine-month project, AmeriCorps members conducted education, outreach, and restoration activities throughout the Watts Branch subwatershed. This coordinated application of the SHIP boasted many results that will have a long-lasting positive impact on the watershed community and the stream.

School students learned about the importance of trees and also planted trees on school property where they can watch them mature. Watershed residents received environmental education materials, more than 1,000 stormdrains were stenciled with the message "Don't Dump - Anacostia River Drainage", and trash was removed both from neighborhood streets and the stream system. At the subwatershed level, significant progress was made: a series of tree plantings resulted in re-establishment of nearly two linear miles of riparian buffer. Approximately 1,500 trees, all native species, were planted during the nine-month project.

Contact: Lynn K. Stabenfeldt
Metropolitan Washington Council of Governments
777 North Capitol Street, NE
Washington, DC 20002
(202) 962-3363

Urban Riparian Restoration in the Difficult Run Watershed

Fairfax County, Virginia



KEY WORDS

- ✓ urban
- ✓ watershed restoration
- ✓ citizen involvement

Background

The Difficult Run watershed is the largest watershed in Fairfax County, Virginia, totaling 56,566 acres. Land use within the watershed is changing rapidly from forested areas to urban uses, contributing to adverse water quality conditions and other environmental degradation. Ten major tributaries drain the diverse land uses which make up its watershed (see Appendix A-33 for map). Difficult Run is a direct tributary of the Potomac River and the Chesapeake Bay.

The stream valley areas of the Difficult Run watershed have been reserved as Ecological Quality Corridors by the Fairfax County Planning Commission with management by the Fairfax County Park Authority. Intensive development within the watershed has resulted in reduced riparian buffer widths; in some cases, these buffers have been eliminated entirely. To address concerns about degraded and disappearing riparian forested buffers and the associated impacts to streams, the Virginia Department of Forestry established the Difficult Run Urban Riparian Restoration Project in 1993.

Project Description

The Difficult Run Urban Riparian Restoration Project was initiated to assist communities in restoring urban streams. The watershed-wide reforestation effort is a partnership between State and local government, and Fairfax County citizens. Project implementation, which is taking place in three phases, includes: identification of priority riparian restoration sites within the watershed, reforestation of identified areas, and a watershed-wide education and outreach program.

Protocol for Evaluation of Priority Riparian Buffer Reforestation Sites:

In 1994, an interagency work group developed a protocol for the evaluation of riparian buffers; the protocol provided the basis for evaluation of priority riparian reforestation sites. Members of the work group included representatives of the Virginia Department of Forestry, the Metropolitan Washington Council of Governments, Fairfax County Park Authority, and the Prince William County Soil and Conservation District. The established protocol comprises the following two steps for selection of priority planting sites: (1) Perform

Beginning in 1996, the Difficult Run Urban Riparian Restoration Project will expand its focus on the mainstem to also include the tributaries.

vegetation inventory to determine the extent to which the riparian area and adjacent floodplain has undergone a loss of vegetation. (2) Select and prioritize restoration sites to achieve the maximum environmental benefit using a vegetation inventory, local land use and tax maps, soil maps and descriptions, topographical maps, and aquatic resources needs of local stream conditions.

The Virginia Department of Forestry began the Difficult Run Riparian Restoration Project by identifying priority restoration sites along the mainstem. Criterion considered during the evaluation process are summarized below:

A scoring system based on 15 land use and environmental characteristics is used to prioritize reforestation and restoration needs.

Criterion for Site Selection	Definition
Cover Type	Characteristic vegetation living in study area
Density	Quantity of plants per unit area
Continuity	Same cover type without interruption
Contiguous	Adjoining land or cover types
Landownership	Property rights by purchase or dedication
Adjacent Land Use	Land use directly surrounding study area
Recreational Use	Used for leisure activities
Buffer	Sufficient vegetation to protect and provide easy transition between different land uses
Stream Order	Importance of stream based on size and number of tributaries
Stream Hydrology	Properties of stream flow
Stream Morphology	Characteristics of stream based on stream banks/bed
Slope	Land contours or elevation variances
Erodability	Tendency of soil to be displaced by wind or water
Sensitive Resources	A resource easily destroyed or damaged
Fisheries	Aquatic environment capable of supporting fish species

A value of 1, 2, or 3 was assigned to each criterion referenced in the preceding table, a value of "1" representing a poor score and a "3" representing a good score. Following the evaluation of each site, the sum of points was divided by the number of criterion that were applied to the site, insuring a constant scoring system throughout the evaluation process. If a criterion could not be attributed to the site, no points were scored for that characteristic. The scores from each sheet were totaled and sites were prioritized according to their need for restoration. Sites with the lowest total overall score were the highest priority sites for riparian buffer restoration.

The protocol was used to evaluate seven sites along the Difficult Run mainstem for reforestation needs; five of the seven sites were found to be in need of restoration. The sites were planted in Spring 1994 under the supervision of Fairfax ReLeaf, Fairfax County Park Authority, and the Virginia Department of Forestry. In 1996, the Virginia Department of Forestry will begin expanding the project to the Difficult Run tributaries.

Riparian Reforestation:

The Difficult Run riparian reforestation program has been ongoing since 1993. Priority enhancement areas were first identified and impaired floodplain areas were then targeted for planting efforts. Approximately 8,000 tree seedlings have been planted since the program's inception. In 1995, a 150-foot buffer was established near a residential subdivision development; more than 1,500 native seedlings planted in this effort. Tree plantings were executed by volunteers generated by Fairfax ReLeaf, a local non-profit organization.

Watershed-wide Education and Outreach Program:

Program coordinators are currently developing the watershed-wide education and outreach program, the objective of which is to mobilize citizens to further efforts to improve water quality through the establishment of healthy riparian buffers. The maintenance and enhancement of restored areas will be a primary goal.

Project Impact

The expected outcome of the Difficult Run Urban Riparian Project includes:

- improved water quality,
- increased wildlife habitat,
- improved flood control, and
- lower levels of nonpoint source nutrients,
- improved aesthetic value for buffer zones, and
- decreased stream bank erosion.

These anticipated benefits are directly related to re-establishment of forested riparian buffers along the Difficult Run's mainstem and its tributaries.

Project Partners

Funds for the 1994 and 1995 plantings were provided by the USDA Forest Service - Northeastern Area. The EPA's Chesapeake Bay Program has agreed to support future planting efforts. And, Fairfax ReLeaf has provided and will continue to provide volunteers for future planting efforts.

Contact: Judy Okay, Coordinator
Difficult Run Riparian Restoration Project
12055 Government Center Parkway, Suite 904
Fairfax, VA 22035
(703) 324-1489



Forest Conservation

Agricultural and Forestal Tax Districts

Fairfax County, Virginia



KEY WORDS

- ✓ urbanizing
- ✓ resource protection
- ✓ tax incentive

Background

Fairfax County's proximity to Washington, D.C., has resulted in the loss of much of its farm and forest land to development. In the early 1980s, concern with this trend prompted the County to examine options that would give property owners incentive to preserve undeveloped lands.

Fairfax County's concerns were alleviated in part when, in 1982, the Code of Virginia gave localities the enabling legislation to establish Agricultural and Forestal Districts (A&F Districts) of Statewide Significance. The minimum acreage requirement for A&F Districts was set at 500 acres. At that time, there were few large parcels in Fairfax County that could qualify for A&F District status. Fairfax County's desire to provide a similar option for owners of smaller parcels resulted in its lobbying the State Legislature for a scaled-down version of the A&F District legislation. As a result, the Virginia Assembly adopted legislation that gave counties with the Urban Executive form of Government the ability to establish Local A&F Districts with a 25-acre minimum.

Subsequently, the Fairfax County Code was amended to incorporate the Local A&F District program. Following is the purpose of the Local A&F District as stated in Chapter 15 of the County Code:

"It is Fairfax County policy to conserve and protect and to encourage the development and improvement of its important agricultural and forestal lands for the production of food and other agricultural and forestal products. It is also Fairfax County policy to conserve and protect agricultural and forestal lands as valued natural resources which provide essential open spaces for clean air sheds, watershed protection, wildlife habitat, aesthetic quality, and other environmental purposes."

The Local A&F District program uses tax benefits as an incentive for owners of agricultural or forestal areas to maintain those lands in an undeveloped state. In Fairfax County, approximately 80 percent of total area protected through this program is forested.

The Local A&F District program uses tax benefits as an incentive for owners of agricultural and forestal areas to maintain those lands in an undeveloped state.

Project Description

The minimum acreage requirement for the Local A&F District program is currently 20 acres. Other guidelines for the establishment of a Local A&F District include:

- The property must be owned entirely by an individual, family, or members of a family trust.
- The property should be located in an area which is depicted on the Comprehensive Plan Map as being targeted for no more than one dwelling unit per acre.
- The property should be zoned to a district which does not permit more than one dwelling unit per acre.
- There should be a history of farming and forestal uses on the property.
- Forestal and/or agricultural improvements should have been made to the property in the last ten years.

When a local A&F District is established, the property is assessed at its land use value rate rather than the market value rate. Historically, the reduction of property taxes for land located within an A&F District has been approximately 60 percent with some properties receiving a reduction in property taxes of over 90 percent. In exchange for the tax benefits, the property owner must keep the property in agricultural or forestal uses.

The life of a Local A&F District is eight years. The property owner can choose to withdraw from the A&F District program at any time subject to roll back taxes (the difference between market rate and land use rate) for the previous five years, including interest and penalties. At the end of the eight-year period, the property owner can choose to renew the A&F District designation for an additional eight-year period.

Project Impact

Since the establishment of the Local A&F District program in 1983, 42 local A&F Districts have been established, protecting 2,100 acres. All applicants have reapplied for Local A&F District status upon completion of the eight-year program.

Contact: Lorrie Kirst, Sr. Staff Coordinator
Zoning Evaluation Division, Office of Comprehensive Planning
12055 Government Center Parkway
Fairfax, VA 22035
(703) 324-1290

Enhanced Forest Preservation at Regional Stormwater Management Pond Sites

Fairfax County, Virginia

Background

Since the 1950s, Fairfax County, Virginia has experienced rapid development, growing from a population of approximately 100,000 to over 800,000 in 1995. This urbanization has brought about profound changes in the hydrologic regime of local watersheds by drastically reducing infiltration, increasing runoff, increasing flooding and erosion, and introducing additional sources of pollutants. Serious impairment of the County's waterways has resulted.

Beginning in the early 1970s, the County recognized and responded to the need for regulations designed to minimize further impairment of the County's waterways. In 1972, the County adopted a policy requiring on-site stormwater detention for all new development. In 1982, the County adopted water quality measures requiring best management practices (BMPs) for all new development in watersheds draining to the Occoquan reservoir, the primary drinking water source for much of the County. In 1993, the requirement for new development to provide BMPs was extended to include the whole County as a result of the passage of the Chesapeake Bay Preservation Ordinance.

By the mid-1980s, rapid development and urbanization had resulted in the proliferation of many small on-site detention ponds designed to serve single developments. A systematic approach for locating detention ponds at the watershed or subwatershed level to achieve the optimal hydraulic benefit from these facilities did not exist.

In 1987, the County engaged a consultant to locate potentially favorable sites for regional detention ponds in the rapidly developing western portion of the County. (Regional ponds are typically designed to control runoff from drainage areas greater than 100 acres in size.) The study resulted in a plan for 31 wet (i.e. with permanent pool) and 103 dry regional detention pond locations identified.

Regional ponds, while more cost-effective to build than on-site ponds, pose serious threats to the floodplains and perennial streams in which they are typically sited. The potential for regional ponds to severely impact the riparian zone at a single location increases further when major grading is done in the impoundment area to maximize storage volume. To address the threats that



KEY WORDS

- ✓ stormwater management
- ✓ development strategy
- ✓ standards

The Forested Wetlands Committee was convened to study ways in which to minimize the adverse environmental impacts that typically occur when regional stormwater detention ponds draining 100 acres or more are sited.

regional ponds typically pose to the riparian environment, the County Board of Supervisors established an ad-hoc Forested Wetlands Committee (FWC), and subsequently charged it with identifying pond siting and construction techniques that would minimize these potential impacts.

Project Description

In 1991, the FWC was established to study methods to protect forested wetlands during implementation of Regional Stormwater Management Ponds. The Committee was comprised of representatives appointed by each Board member and representatives from other groups concerned with this issue including the Northern Virginia Soil and Water Conservation District and the Fairfax County Chamber of Commerce.

Committee members reviewed and commented on the Code of Virginia's stormwater enabling legislation, for its application to Fairfax County. They also considered ordinances that might be necessary to protect these sensitive areas. To minimize the impacts of regional ponds on forested wetlands, the FWC made the following recommendations:

- An early evaluation of the site is to be made by a Wetlands Subcommittee to include environmental factors such as wetlands, wildlife habitat, nursery for aquatic life food chains, amount and quality of tree cover, etc.
- Allow deviations from present County policy which requires dry ponds to have a concrete low flow channel and grass cover by allowing native vegetation to exist in the impoundment area to the extent possible.
- Protective conservation easements should be placed on all impoundment areas described above in order to prevent maintaining these areas as grassed areas.

Project Impact

Benefits from the Forested Wetlands Committee's recommendations will also include greater preservation of the existing natural riparian environment with its associated wetlands, trees, and wildlife habitat. These facilities should have superior BMP capabilities because of the greater presence of wetlands and natural vegetation with their ability to biologically and chemically remove nutrients.

Contact: William W. Henry, Chief
Department of Public Works
Stormwater Management Branch
12000 Government Center Parkway, Suite 449
Fairfax, VA 22035-0052

Fairfax ReLeaf's Urban Forest Benefits Analysis

Fairfax County, Virginia

Background

Fairfax ReLeaf was formed in 1991 by Fairfax County residents concerned with the rapid and unchecked removal of trees during the development process. Loss of forest cover has been considerable over the last two decades, a trend that this non-profit volunteer organization hopes to reverse. In this effort, more than 700 Fairfax ReLeaf volunteers plant trees on common public lands, assist in natural resource projects and distribute educational material about value and associated benefits of trees.

In 1994, the Fairfax County Board of Supervisors formed the Tree Preservation Task Force. Formation of this task force resulted from citizen concerns about unchecked tree removal during the development process. Charged with exploring new methods to enhance preservation of trees through existing land development practices, the task force was asked to formulate recommendations on code amendments and modification of land development statutes. At that time, quantitative information relating to the extent, nature, and value of Fairfax County trees was not available.

Fairfax ReLeaf recognized the need for this information largely because trees are frequently thought of as an easily replaceable resource. The notion that mature trees provide important services that have associated economic benefits is not well understood. These services include energy conservation, stormwater runoff reduction, carbon storage, and air pollution mitigation. With the assistance of their many volunteers, Fairfax ReLeaf initiated an assessment of the quantitative benefits of Fairfax County trees in 1995.

Project Description

Fairfax ReLeaf initiated the *Urban Forest Benefits Analysis*, a three-phase study, to generate reliable quantitative information for the Task Force's use in formulating policy recommendations for the Board of Supervisors:



KEY WORDS

- ✓ economic benefits
- ✓ citizens' initiative
- ✓ tree preservation

An urban forests computer program provided current dollar values for tree functions including annual air pollution mitigation and stormwater runoff potential.

The Analysis demonstrated that trees not only have aesthetic value, they also reduce air pollution, perform stormwater management functions, and reduce air conditioning and heating bills through shade and wind speed reduction.

- Phase I:** Estimate the total number of trees in Fairfax County using aerial photography and on-site sampling of 220 randomly selected plots. The Phase I analysis also approximates the species distribution, average physical characteristics and health condition categorized by location and functionality. Using the QuantiTree computer program, estimate quantifiable benefits of County trees.
- Phase II:** Survey additional sample plots to increase the accuracy of the statistical analysis undertaken in Phase I.
- Phase III:** Provide a full benefits-cost analysis by collecting data on the cost and occurrence of tree maintenance, removal, and damage to public infrastructure and private property.

During Phase I, data was collected from 220 randomly selected sample plots located within Fairfax County, the cities of Fairfax and Falls Church, and the towns of Herndon and Vienna. The resulting data were used to isolate statistical averages of the number and physical characteristics of street, yard, commercial, institutional, park and vacant/wild trees. These averages were then entered into QuantiTree along with local climatologic data, utility costs and average hourly concentrations of major pollutants. Results of the Phase I Benefits Analysis provided a baseline snapshot of the nature of Fairfax County's tree cover in terms of health, size, and number.

An urban forests computer program - QuantiTree - provided the framework for Phase I data collection and analysis. Using environmental and socioeconomic inputs, QuantiTree provides current dollar values for the following tree functions: annual air pollution mitigation; annual carbon storage; annual stormwater runoff reduction; and, annual energy conservation. QuantiTree outputs for air quality, stormwater management and energy conservation are summarized in the table on the following page.

In addition to quantifying the economic benefits of Fairfax County trees, results of the Phase I Benefits Analysis indicate that:

- approximately 57-million trees currently grow on 239,915 acres of Fairfax County and associated jurisdictions; and,
- on average, each tree provides a total of \$7.03 in services annually for air pollution control, storage of atmospheric carbon, stormwater runoff mitigation, and utility energy conservation.

URBAN FOREST BENEFITS ANALYSIS

	Air Quality	Carbon Storage	Stormwater Management	Energy Conservation
Street Trees	\$80,000	\$45,500	\$2,717,600	\$7,896,900
Park Trees	\$84,100	\$45,500	\$591,500	\$3,788,600
Yard Trees	\$1,152,900	\$679,000	\$28,957,900	\$83,856,800
Vacant/Wild Trees	\$3,487,000	\$1,848,000	\$22,498,300	\$232,452,000
Commercial Trees	\$44,100	\$24,500	\$1,840,400	\$4,456,600
Institutional Trees	\$12,000	\$7,000	\$377,400	\$934,400
TOTAL	\$4,860,100	\$2,649,500	\$56,983,100	\$333,385,300

Fairfax ReLeaf completed Phase I work in June 1995. Phase II began in Fall 1995, and Phase III will begin at a later date.

Project Impact

The results of Fairfax ReLeaf's *Urban Forest Benefits Analysis* clearly demonstrate the immense economic, socioeconomic, and environmental benefits that trees have for a community. The *Analysis* demonstrated that trees not only have aesthetic value, but that they also reduce air pollution, perform stormwater management functions, and reduce air conditioning and heating bills through shade and wind speed reduction. Other environmental benefits from trees planted for energy conservation include reduced power plant emissions and water consumption.

Fairfax ReLeaf was not able to complete Phase I work before the Tree Preservation Task Force made its recommendations to the Board of Supervisors. However, a report which summarizes the findings of the *Urban Forest Benefits Analysis* has been submitted to the Board of Supervisors for its consideration. Fairfax ReLeaf volunteers will continue to inform the citizens of Fairfax County about the environmental and socioeconomic services provided by trees through the organization's public education and outreach activities.

Project Partners

The Fairfax County Board of Supervisors contributed moneys for the purchase of the QuantiTree software program. Thirty-five ReLeaf volunteers assisted in Phase I of the study.

Contact: Mike Knapp
Urban Forestry
12055 Government Center Parkway
Fairfax, VA 22035
(703) 324-1729

Forested Buffer Strip Ordinance

Sussex County, Delaware



KEY WORDS

- ✓ urbanizing
- ✓ agricultural/residential land use compatibility

Background

Agriculture is the largest industry in Sussex County, Delaware. Rapid urbanization in parts of the County and its infringement on agriculture has resulted in conflicts between homeowners and the farming community; dust and odor associated with general farming practices have prompted numerous complaints from rural homeowners in recent years. Sussex County developed the *Forested Buffer Strip Ordinance (1993)* to help alleviate the tensions between these two groups.

Project Description

The Forested Buffer Strip Ordinance requires the establishment of forested buffer strips between subdivisions and existing farmland or managed woodlands and is intended to achieve the following objectives:

- promote and protect the health, safety, convenience, orderly growth and welfare of the citizens of the County;
- assist in the proper development, conservation of property values and use of land in the County;
- encourage the preservation and conservation of farm land; and
- insure the compatibility of residential and agricultural uses of land.

The Ordinance charges Sussex County Planning and Zoning personnel with overseeing the establishment of buffer strips for all new residential developments that are within 300 feet of land used primarily for agricultural purposes. The buffer strip is defined as follows:

a strip of land, not less than 30 feet in width, exclusive of any residential lots and located along the outer perimeter of any portion of a major subdivision adjacent to agricultural farmland.

Additionally, the buffer strip should be comprised of at least two rows of trees that are three to four feet tall.

The County Planning and Zoning Department provides basic information to developers that must comply with the Ordinance. This includes species

Sussex County adopted the Forested Buffer Strip Ordinance to help alleviate tensions between farming and residential communities; a forested buffer strip is now used to separate these sometimes conflicting land uses.

suitability for sites, mature tree sizes, pest management information, and potential sources for tree species. County staff also provides technical assistance during the development process at existing wooded sites to minimize the impact of development on existing trees. Where natural buffers already exist, such as a hedgerow, the County will determine if supplemental plantings are needed. It is the County's responsibility to ensure that the buffer is properly installed and maintained over time.

Project Impact

The Ordinance is a first step towards providing a framework within which agricultural and residential land uses can coexist. Conservation benefits of forested buffer strips include improved water quality protection, improved air quality, and habitat establishment.

Contact: Austin Short
State of Delaware
Department of Agriculture
2320 South DuPont Highway
Dover, Delaware, 19901
(302) 739-4811

Forest Conservation in Land Development

Midlothian, Virginia

Background

East West Partners has been developing environmentally sensitive residential communities for more than 20 years. The company is particularly committed to preserving and integrating mature forest stands into their development projects. Admittedly, monetary gain is important to the company, which understands that beyond providing important environmental benefits such as reducing runoff velocities, filtering pollutants, and producing oxygen, mature trees can enhance the marketability of a residential development. The company has developed notable projects across the United States, some in the Chesapeake Bay watershed.

Project Description

The Woodlake residential community development, located near Richmond, Virginia, is one such project. Located on the shores of a 1,700-acre fresh water reservoir which provides more than 12 million gallons of drinking water daily to Chesterfield County, development objectives for this 4,000-acre site included both protection of significant tree stands and the reservoir.

Measures taken by East West Partners throughout the development process stressed reduction of impacts to the reservoir and surrounding environment. These measures included establishment of a pre-development advisory committee and application of environmental guidelines for development that were more stringent than those required by the local planning department. Conservation of significant forest stands was a primary objective of the development process.

Advisory Committee:

East West Partners initiated the development process by convening an advisory committee to identify and assess potential development-related impacts to the drinking water reservoir. The committee, comprised of technical professionals and academics, made recommendations on setback and stormwater runoff requirements. Issues of concern and resultant recommendations were incorporated into project design, including Best Management Practices for the control of stormwater runoff.



KEY WORDS

- ✓ planned unit development
- ✓ drinking water protection
- ✓ development strategy
- ✓ homeowner covenants

Forest stands and significant trees were protected during each stage of Woodlake's development process.

The Development Process-Preservation of Significant Forest Cover:

Forest stands and significant trees were protected during each stage of Woodlake's development process. This four-stage process comprised the following phases:

- planning,
- siting,
- utility construction, and
- post-construction.

Planning Phase. Areas with significant tree cover were identified with the aid of site visits and aerial photography. Other physical characteristics identified include wetlands, flood plains, steep slopes, water courses, and highly erodible soils. This information was then mapped and used to establish buffer areas and open space; more than 20 percent of the development was designated as buffer or open space.

Siting Phase. An architectural review committee played a key role in the preservation of significant trees at the lot level. The committee reviewed detailed site plans which identified the location of proposed structures (houses, driveways, etc.) and existing significant trees. To further ensure that trees and other important environmental features were conserved during development, a representative of the committee visited the property to assess the accuracy of the proposed site plan. Site plan approval from the representative was required prior to initiation of construction activities.

Construction of Utilities. Contractors were instructed to clear the minimum right-of-way width and prohibited from operating their equipment in environmentally sensitive areas. Sewer and water lines, gas, electric and telephone lines were placed in the road right-of-way wherever possible.

Post-Construction/Homeowner Covenants. Covenants drafted by East West Partners, then passed to the Community Association, require that any tree larger than six inches in diameter and two feet in height be removed only with the consent of the Community Association. Consent to remove a tree will only be granted if it is dead, jeopardizing a foundation, or on a site where an approved addition to the home will be constructed.

Project Impact

East West Partners has found that their environmentally sensitive development style has resulted in a minimization of impacts to the environment and a

maximization of profits. Their development in Virginia has enjoyed a 40 percent market share in the price ranges that it represents.

The Woodlake development has been recognized by the Urban Land Institute as an outstanding example of residential, planned community design. Particularly notable benefits of the development process include:

- protection of the environment,
- integration of wooded areas and built areas, and
- preservation of significant tree stands.

Water quality monitoring, conducted for more than 10 years at this site, has shown that post-development pollutant loads are relatively low.

Contact: Hank Meyer
East West Partners
PO Box 1984
Midlothian, VA 23112
(804) 739-3800

Resident Urban Forest Protection: Stoney Run Park Committee

Baltimore, Maryland



KEY WORDS

- ✓ resident initiative
- ✓ educational laboratory
- ✓ public-private partnership

Background

During the last 10 years, Stoney Run Park has been transformed from a city park boasting little vegetative diversity, to a peaceful woodland for walking and an educational laboratory offering a diverse and rich variety of native trees, shrubs, and wildflowers. The focal point of this 12-acre park is Stoney Run, a Baltimore City stream, which flows through a 1/2-mile stretch between Cold Spring Lane and Wyndhurst Avenue. The surrounding area is largely residential.

In 1985, area residents with a fondness for trees and natural systems formed the Stoney Run Park Committee. At that time, 200 well-established trees thrived on the property. A healthy understory did not exist, however, as frequent mowings by City staff prevented the establishment of saplings, seedlings, and herbaceous plants. Unfortunately, exotic plants such as multi-flora rose and bamboo thrived despite the mowings. Committee members began working to provide opportunities for the establishment of a healthy and diverse woodland.

Initially, the committee focused on tree plantings in Stoney Run Park. Over time, their activities have grown to include environmental education for area residents. The committee has also expanded its area of geographic interest, and is now working to preserve and enhance a one-mile section of the stream located downstream of Stoney Run Park.

Project Description

Nearly 10 years ago, Stoney Run Park Committee members began planting native shrub and tree species. There are more than 400 species of native trees and shrubs which the committee hopes to establish in the 200-foot-wide park that lines both sides of Stoney Run. By planting species native to Maryland, the Committee aims to establish a living laboratory or "botanical zoo" that can be used to educate area residents about the value of diverse natural habitats.

Materials for the Committee's planting efforts are typically purchased with donations from area residents. On two separate occasions, however, Committee members have moved native plants from natural areas scheduled for development to Stoney Run Park.

Committee members have moved native plants from natural areas scheduled for development to Stoney Run Park.

Early in the project, Committee members worked closely with the City of Baltimore to ensure that the park would no longer be mowed. With the aid of a tractor donated by an area resident, Committee members now maintain the park themselves. This arrangement benefits both groups: the City is able to use its resources elsewhere, and area residents are able to ensure that their urban laboratory is well cared for and protected.

The Committee's partnership with the City of Baltimore extends beyond establishment of the park as a no mow zone. The City has supported the Committee's efforts with donations of mulch for their tree planting and tree care work. Currently, the City is working closely with Committee members to identify opportunities for stream bank stabilization projects; stream bank erosion is a common problem at this streamside park.

The Committee is also dedicated to enhancing the community's awareness of environmental issues through lectures and discussions. They have constructed a permanent bulletin board at Stoney Run Park that is used to share information with individuals visiting the park. On the bulletin board, one can read of events that relate to the park such as plants currently in bloom, nearby development issues, and upcoming tree plantings. Environmental information of national and global concern is also posted in an effort to place the Stoney Run Park restoration effort in a larger context.

The Committee's work has sparked interest in five area schools. These schools have begun joint projects along the stream and are now using the stream system as an outdoor classroom.

Project Impact

Over the last ten years, the number and diversity of trees, shrubs and wildflowers represented in Stoney Run Park has increased remarkably. In 1985, this 12-acre park boasted just 200 mature trees (one foot or more in diameter). Today, more than 1,000 healthy tree, shrub and wildflower specimens thrive on park land. The end result of the Committee's planting efforts is that the diversity currently found in Stoney Run Park is greater than naturally occurs in the Baltimore area. Committee members are proud of their efforts and hope that area residents and schools will use Stoney Run Park as an outdoor laboratory to learn more about the value of trees, shrubs and wildflowers native to the State of Maryland.

This thriving woodland habitat provides a number of benefits to the community. The wooded area serves as a buffer to Stoney Run, a buffer that Committee members are working to lengthen at a site two miles downstream of Stoney Creek Park. By filtering runoff, the buffer contributes to better stream quality;

The Stoney Run Park Committee is working to establish a botanical zoo that can be used to educate residents about the value of a healthy and diverse woodland.

it also provides a peaceful woodland for walking, jogging, and birding. In the future, the committee anticipates that the diverse mix of plant species will contribute to increased diversity in wildlife representation at Stoney Run Park.

Project Partners

The Committee has a yearly operating budget of approximately \$2,000. These funds are donated or raised by local residents and community associations. A newsletter, produced by the Committee and circulated periodically to area residents, has also resulted in cash donations. The Chesapeake Bay Trust has supported the group's efforts with two grants.

Contact: Michael Beer, Chairman
Stoney Run Park Committee
4623 Wilmslow Road
Baltimore, MD 21210
(410) 467-8983

Reston Association's Management of Common Open Space

Reston, Virginia



KEY WORDS

- ✓ conservation planning
- ✓ open space amenities
- ✓ natural areas management

Background

Reston, Virginia, is a planned community located in Northern Virginia. Not a city or town, Reston has established its own by-laws, deeds and design review board. All residents pay taxes to Fairfax County, where the development is physically located. Residents also pay dues to the Reston Association, which owns and manages 1,100 acres of community open space, including numerous recreation facilities.

A commitment to the environment and preservation of open space have guided development at Reston for more than 30 years. Throughout the development process, open space has been set aside to maintain the natural beauty of the area, create natural buffers between residential and commercial areas, and provide recreation and education for residents.

In 1970, the Reston Association established the Open Space Department. Long-term management of the natural areas preserved during development is the department's sole responsibility. This commitment to the care and management of common open space is unusual among homeowners associations; the extent of open space care and management for many homeowners associations is limited to mowing grass and occasional tree plantings. Often, these limited management activities are provided by local contractors who may be replaced over time, or volunteers that have no long-term management plan for the resource. The provision of long-term, cohesive management of the open space and local residents makes Reston unique.

In 1970, the Reston Association established the Open Space Department to care for and manage the common natural area that is set aside during development.

Project Description

The Open Space Department's natural areas management program comprises the following three components:

- natural areas management plans,
- resident guidelines for the care and use of natural areas, and
- education.

Natural Areas Management Plans:

Reston's Natural Areas Management Plans identify opportunities for diversity in the management and care of natural areas. In these plans, emphasis is placed on the retention and protection of trees; approximately 70 percent of all open space land in Reston is wooded. The department also identifies areas suitable for natural meadows and wildflower plantings. Currently, 50 miles of foot paths have been incorporated into Reston's Open Space Management Plans, creating a network that makes the open space easily accessible to residents.

Resident Guidelines for Natural Areas:

The Open Space Department values highly the common natural areas, and has developed guidelines that all residents are asked to follow. A pamphlet entitled "Guidelines for the Care and Use of Reston Association's Natural Areas" summarizes these guidelines as follows (see Appendix A-34 to A-35 for guidelines):

- the natural areas are preserved in their intended state;
- wooded areas are left natural;
- no foreign plants or animals are introduced;
- all plants, topsoil, humus and down wood are left undisturbed;
- no refuse is discarded onto these lands; and
- use of motor vehicles is considered a trespass.

Education:

Education of Reston residents is an equally important component of Reston's natural areas program. Through education, open space staff help residents understand why restrictions are placed on their use of common areas. Another result of education is a reduction in maintenance costs for open space management.

A good example of the Open Space Department's commitment to education can be found in their mascot - Samantha the Snag. Samantha the Snag made her debut at Reston's 1995 Arbor Day event. Using humor as an educational vehicle, the costume design incorporated numerous hiding spaces for the many creatures that depend on snags for food and shelter. Chipmunks, snakes and other critters were pulled from Samantha the Snag's crevices to demonstrate to Reston residents that there is life in dead trees. At Reston, snags are not removed from natural areas unless they pose a safety hazard.

Project Impact

Articulated by Reston's founder, the following are some of the goals which have guided development and growth for more than 30 years:

- that people be able to live and work in the same community;
- that beauty - structural and natural - is a necessity of the good life and should be fostered; and,
- in order to be completed as conceived, it must also be a financial success.

Since 1963, development at Reston has provided co-development of living and commercial space so residents can be employed close to home, emphasized the preservation and use of natural areas for leisure, and encouraged varied housing, with many homes organized into clusters. The integration of living, commercial, and natural space has largely contributed to the success of this planned community.

In recent years, open space and natural settings have become an important amenity for many homeowners. These natural areas are highly valued by Reston residents; a recent survey of the Reston community revealed that more than 80 percent moved to Reston because of the open space amenities. Significantly, trees were identified by many as an important factor influencing this decision. The Open Space Department at Reston manages both the resource and the people that use it to ensure that Reston's natural features are maintained in a responsible manner for future generations.

Contact: Claudia Thompson-Deahl
Reston Association
Central Services Facility
12250 Sunset Hills Road
Reston, VA 22090
(703) 435-6547

Revolving Loan Fund for Open Space Acquisition

Calvert County, Maryland



KEY WORDS

- ✓ open space acquisition
- ✓ land trust resource
- ✓ natural area preservation

The Revolving Loan Fund is a resource for land trusts that are committed to preserving significant environmental features such as forested areas.

Background

On April 26, 1993, the State of Maryland adopted legislation granting County Commissioners the authority to set up a special fund for the purpose of preserving open space. The bill authorizes County Commissioners to do the following:

- establish a non-lapsing, revolving special loan fund for making loans to nonprofit land trusts;
- accept contributions to the fund; and
- invest revolving special loan fund assets as other County revenues are invested.

The Revolving Loan Fund will provide financing to nonprofit organizations for acquisition of open space. As structured, the loans will be paid back by the nonprofit organization, providing additional funds for other acquisitions. The revolving nature of the loan enables a small amount of seed funding to support a number of projects over time. In Calvert County, the Revolving Loan Fund is a resource for land trusts committed to preserving significant environmental features such as forested areas.

Project Description

In 1994, Calvert County Commissioners established the Revolving Loan Fund to provide funds to non-profit organizations wishing to preserve open space within the County. The fund currently totals \$1 million. These funds allow the County to assist local land trusts in meeting their goals of conservation and preservation, while furthering the County's goal of open space preservation and public access. The County benefits further because stewardship of the parcel is, in turn, provided by the land trust.

The Revolving Loan Fund provides financial assistance for the following land trust efforts:

- acquisition of land for active and passive recreation for the general public,

- preservation of natural areas where limited public access is allowed,
- acquisition of land which "buffers" existing County parks and natural areas, and
- preservation of historically significant land or structures where controlled public access would be allowed.

Borrowers of Revolving Loan Fund moneys must place a conservation easement on the land by the time the loan is fully repaid. A 10-year limit has been established for loan repayment. Previously purchased land or development of land is not eligible for financing under this program. Funds are to be used only for new acquisitions (see Appendix A-36 to A-38 for copy of application).

The County's Transfer of Development Rights (TDR) program contributes to the feasibility of the Revolving Loan Fund for local land trusts. The TDR program allows land trusts to sell development rights from parcels acquired with assistance of the Revolving Loan Fund, the proceeds from which are used to repay the County.

Project Impact

Since its establishment in 1994, two land trusts have received Revolving Loan Fund moneys - the Plum Point Environmental Land Trust and the American Chestnut Land Trust. In 1995, the Plum Point Environmental Land Trust purchased a 185-acre riparian tract located primarily in the Chesapeake Bay Critical Area. The parcel is 70 percent forested with a mixture of upland vegetation. This acquisition has resulted in protection of more than 120 acres of forested lands.

The American Chestnut Land Trust recently purchased a 140-acre parcel in the Parker's Creek watershed. This property is located in the center of the region's largest and most diverse remaining contiguous natural area. To the east of the property is a 100-acre parcel that has been permanently preserved through TDR sale. Along with other protected tracts in the area, this purchase has effectively created a 1,100-acre wildlife corridor/greenway.

The County is currently considering additional requests for Revolving Loan Fund assistance. As the program matures, it is anticipated that valuable habitat, riparian buffers, and forested areas will be protected in perpetuity. Revolving Loan Fund acquisitions in Calvert County will support the restoration and preservation of the Chesapeake Bay watershed.

Funding for the initial loan was secured by the Calvert County General Fund. It is anticipated that the availability of these funds will encourage contributions

More than 300 acres of environmentally sensitive lands have been purchased by local land trusts since the Revolving Loan Fund was established in 1994.

from other sources to the project. Borrowers that are able to secure leveraging funds from other private or public sources will be given priority for approval. For example, the American Chestnut Land Trust used more than \$10,000 raised privately from their membership to help secure the loan that it received from Calvert County.

Contact: Randi Vogt
Calvert County Planning and Zoning Department
Courthouse Annex
176 Main Street
Prince Frederick, MD 20678
(410) 535-2348

Local Innovations: State of Maryland's Forest Conservation Act

Maryland

In 1991, the State of Maryland passed the most comprehensive tree preservation law in the country - the State Forest Conservation Act. The basic objective of the law is to contribute to a State policy of "no net loss" of forest land. As crafted, the law required local governments with planning and zoning authority to develop and adopt local forest conservation programs by January 1, 1993.

Simply stated, Maryland's Forest Conservation Act identifies conservation or preservation of forest stands as a priority. Tree preservation is achieved through local forest conservation programs which require:

- **Forest Stand Delineation.** All persons making an application for a subdivision, grading, or sediment control permit on areas greater than 40,000 square feet must submit a detailed analysis of the forest. This analysis, prepared by a licensed forester, landscape architect, or other qualified professional will contain maps showing all water bodies, slopes, soils, and a complete description of the type, size and quality of the forest and trees found on the site.
- **Forest Conservation Plan.** Upon approval of the *Forest Stand Delineation*, an applicant must submit a Forest Conservation Plan. The Plan provides a blueprint for the retention and protection of forested areas, and reforestation and afforestation in response to the impacts of land use changes. Also, the *Plan* must provide a binding, two year management agreement to protect new plantings and a long-term protective agreement, such as deed covenants or restrictive easements, which provide for forest conservation in perpetuity.

The primary intent of the *Forest Conservation Plan* is to provide for the retention of existing forest cover and to restrict forest clearing to only that area essential to the development project. However, the Act is not intended to place unreasonable restrictions on development. To balance these seemingly opposed intentions, the Act allows reforestation and afforestation after every effort to retain existing forest has been exhausted. The preferred sequence for replanting is defined as follows:

- selective clearing or supplemental planting on-site,
- plantings on-site with transplanted or nursery stock,



KEY WORDS

- ✓ state law
- ✓ local implementation
- ✓ "no net loss" forest land

The primary objective of Maryland's Forest Conservation Act is to contribute to a State policy of "no net loss" of forest land. Conservation or preservation of forest stands is a priority.

- plantings on-site with whip or seedling stock,
- landscaping that establishes forest 35 feet in width and a minimum of 2500 square feet,
- plantings off-site with the same hierarchy, and
- natural regeneration on-site or off-site.

The Act defines priority replanting areas as follows:

- buffers on streams (for water quality),
- forested corridors linking large tracts of forest,
- areas of significant wildlife or aquatic habitat,
- buffers between differing land uses, and
- plantings that add to the size of existing forest cover.

To date, 87 Maryland jurisdictions have either established their own program or have assigned responsibility to their own county. More than 2 million acres of forested lands are regulated by the Act, resulting in permanent protection of well over 4,000 acres since its passage.

Local implementation of the Forest Conservation Act has, in some cases, proven a challenge. A common problem encountered by local jurisdictions is a difficulty in securing off-site reforestation/afforestation sites. Local government and private enterprise have responded by devising innovative ways in which to facilitate off-site reforestation and afforestation needs in compliance with the *Forest Conservation Act*; two such innovations are highlighted in the following case studies. Charles County's Planning and Zoning Department is working with the Nature Conservancy to ensure that large, contiguous tracts of existing forested land are preserved. In the second case, a private firm, Forest and Wetland Conservation Associates, Inc. is working with local farmers and private landowners throughout the State of Maryland to restore riparian and sensitive lands, and to create forest buffers with permanent conservation easements in compliance with the Act.

Contact: Ginger Howell
 FCA Coordinator
 Maryland Department of Natural Resources
 Resource Conservation Service, Forestry Division
 Tawes State Office Building
 580 Taylor Avenue
 Annapolis, MD 21401
 (410) 974-3776

Nature Conservancy: Works with Local Government to Provide Off-Site Mitigation Opportunities

Charles County, Maryland



KEY WORDS

- ✓ public-private partnership
- ✓ easement management
- ✓ natural resource protection

Background

Charles County is one of the most rapidly developing counties in Maryland. Objectives guiding this growth include preservation of rural character and protection of natural resources. To ensure that future development occurs in a manner consistent with these objectives, the County has identified designated growth areas where future growth will be directed. These designated growth areas include a section of the Matawoman Basin and the towns of La Plata and Indian Head. Areas located outside of the designated growth areas are, consequently, prime areas for forest conservation and preservation efforts. The County is currently seeking ways to implement the Forest Conservation Act that will result in preservation of large, contiguous forested tracts outside the growth areas.

In that effort, Charles County hopes to support the Nature Conservancy's plans to preserve a forested area in the western part of the County. This "preserve" has been identified by the Nature Conservancy as a priority area for acquisition; it is a Heron rookery and provides habitat for a number of endangered species. The conservancy has identified funding that will allow them to purchase this "preserve" for protection. Currently, the Nature Conservancy and Charles County are exploring an arrangement that would benefit both the conservancy and Charles County by providing off-site mitigation opportunities for local developers through conservation easements.

Project Description

The proposed project will provide opportunities to local developers for off-site mitigation that will result in the preservation of large, ecologically valuable contiguous tracts of forested land in Charles County. As proposed, developers will negotiate directly with the Nature Conservancy for purchase of forested conservation easements in this targeted area. The Nature Conservancy will both hold the easement and manage the land in perpetuity.

The proposed project will provide opportunities to local developers for off-site mitigation that will result in the preservation of large, ecologically valuable contiguous tracts of forested land in Charles County.

Project Impact

The relationship will benefit County government, local developers, and the Nature Conservancy as follows:

- Allows Charles County to assist developers in the implementation of the Forest Conservation Act.
- Provides developers with the opportunity for more extensive utilization of expensive designated growth area lands.
- Provides protection in perpetuity for a large, contiguous forested tract.
- Promotes Charles County's objective of natural resource protection.
- Provides the Nature Conservancy with funds to support future purchases within the County.

Contact: Patricia Haddon
Charles County Office of Planning and Growth Management
Charles County Government Building
P.O. Box B
La Plata, MD 20646
(301) 645-0540

Mitigation for Resource Management of Sensitive Lands (MRMSL)

Derwood, Maryland



KEY WORDS

- ✓ private business
- ✓ fee-for-service
- ✓ resource management

Background

A private firm uses a market-based approach to promote local Chesapeake Bay stewardship efforts in the State of Maryland. The firm specializes in providing fee-for-service forest and wetland mitigation on rural riparian and sensitive lands. In this effort, the firm works with landowners to install best management practices (BMPs) that are designed to reduce nonpoint source pollution from farmland. The firm also works with local governments and developers who are in need of off-site mitigation opportunities for compliance with the *Forest Conservation Act*.

The firm developed the Mitigation for Resource Management of Sensitive Lands (MRMSL) program to reduce nonpoint source pollution originating on rural riparian and sensitive lands. The mitigation strategy combines Total Resource Management, nutrient management, streamside and sensitive land fencing, and streamside forest buffers. Through this program, opportunities for off-site forestry mitigation projects are identified, with emphasis on riparian agricultural areas. These areas are targeted for mitigation, in large part, because the potential reduction of nonpoint source pollution from agricultural land uses is relatively high. As designed, agricultural-related runoff to water courses is minimized and mitigation of forest losses are provided by creating riparian forest buffers on rural riparian sensitive lands. The firm developed this fee-for-service program in response to a growing need for innovative options that support the implementation of Maryland's many environmental laws, including the *Forest Conservation Act*.

A private firm uses a market-based approach to assist developers who are in need of off-site mitigation opportunities to comply with the State of Maryland's Forest Conservation Act.

Project Description

After payment by a developer, the firm works with private landowners to identify and restore degraded riparian buffers on agricultural land. Landowners participating in the program agree to place a permanent conservation easement on their property. In exchange, they receive fair compensation for the easement and project management to implement all needed conservation practices.

The following services are provided by the firm's MRMSL program:

- Locate the off-site forest and wetland mitigation sites in the same County as is the impact and obtain approval from regulatory agencies for the selected mitigation site.
- Provide mitigation project coordination and management with the regulatory agencies.
- Provide all mitigation site planning, legal, survey and recordation services.
- Design and plant the acreage to meet all regulatory agency specifications.
- Perform long-term compliance and spot checks of the mitigation site and report to all regulatory agencies.
- Replant or replace plantings that fail at no additional cost--the firm becomes the risk manager for the project.

In 1994, the firm completed its first private mitigation project on a dairy farm in Montgomery County. The farm was selected for mitigation because of its topography, proximity to county development corridors, and because a major tributary to the Patuxent River and the Triadelphia Water Reservoir passes through the farm. Features of the firm's mitigation plan included the following:

- installation of 2,200 feet of high tensile fencing to keep the cattle out of the stream,
- installation of 2,300 feet of high tensile cross fencing and walkway fencing,
- improvement of the manure storage facility,
- rock lining a cattle walkway,
- installation of a stream crossing for cattle, and
- planting trees along the stream.

Twelve acres of rural sensitive lands were placed under permanent conservation easement. The resultant buffer, which averages 100 feet in width, is comprised of 7.5 acres of wetland reforestation and 4.5 acres of upland reforestation.

In short, the firm plans, designs, implements, and manages off-site mitigation projects. They identify suitable sites, work with the landowners to develop and implement farm conservation plans, identify cost-share moneys available for BMP project implementation, provide a service to developers in need of off-site mitigation, and assist local governments in meeting *Forest Conservation Act* requirements. All of the firm's projects comply with local forestry ordinances that require a development project to retain or replant forest cover when a site is developed.

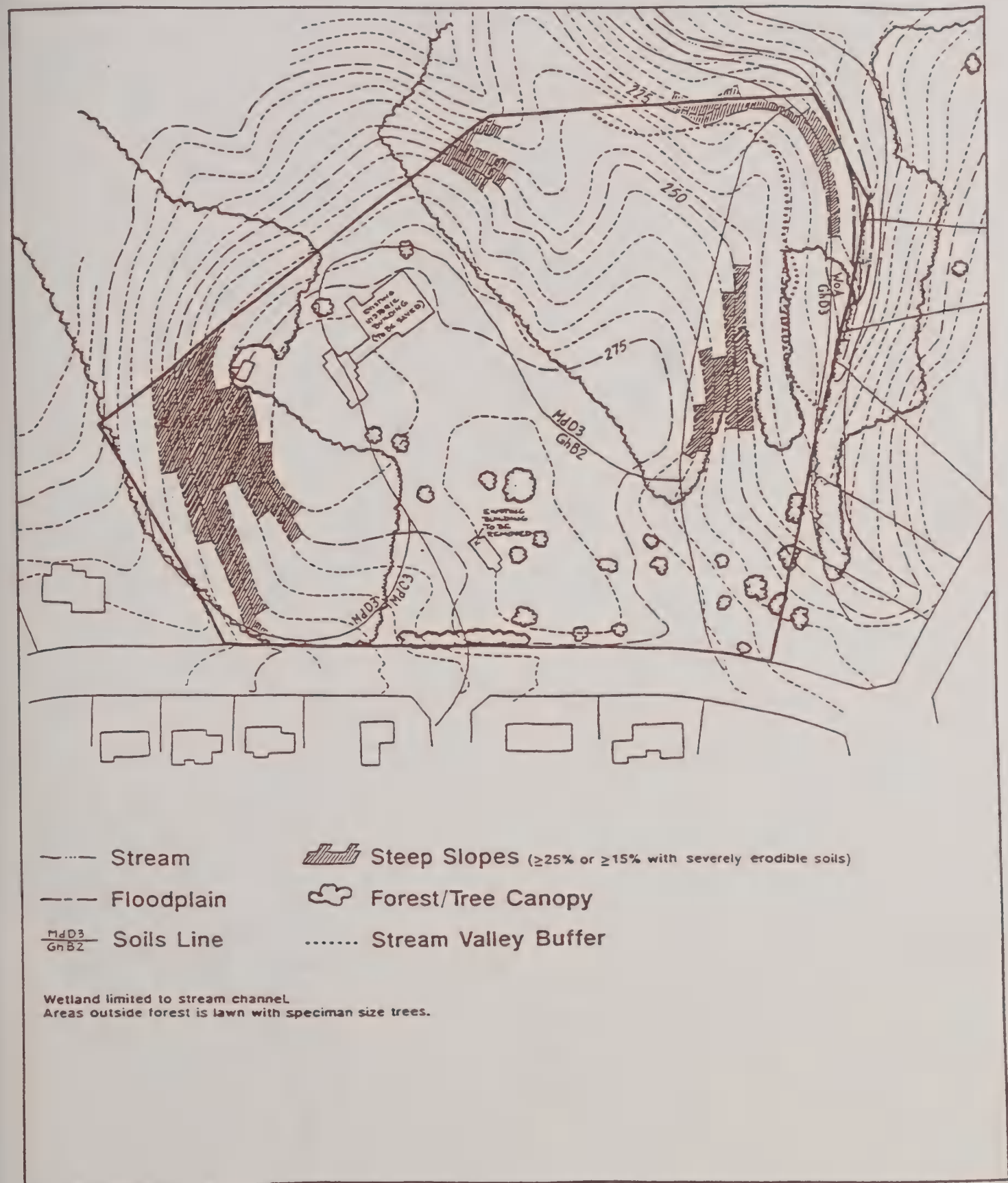
Project Impact

To date, the firm has implemented the MRMSL program at sites in Carroll, Montgomery, and Anne Arundel counties with numerous benefits to landowners, developers, local governments, and the environment. Through this program, nonpoint source runoff from agricultural practices has been reduced through a comprehensive mitigation program that targets riparian and sensitive lands. The establishment of forested buffers is an integral part of the firm's mitigation effort. Nearly 30 acres of sensitive rural lands have been placed under conservation easement through this program.

The firm has helped State and local government meet the requirements of the *Forest Conservation Act* by identifying and securing rural lands for permanent protection through conservation easements. The firm's program also directly supports the Chesapeake Bay Executive Council's *Resolution on Riparian Forest Buffers*.

Appendix

Natural Resources Inventory



- Stream
- Floodplain
- Soils Line
- Steep Slopes ($\geq 25\%$ or $\geq 15\%$ with severely erodible soils)
- Forest/Tree Canopy
- Stream Valley Buffer

Wetland limited to stream channel.
Areas outside forest is lawn with specimen size trees.

Watersheds and Streams

LOWER SUSQUEHANNA RIVER AREA

1 Deer Creek

GUNPOWDER RIVER AREA

2 Prettyboy

3 Loch Raven

4 Little Gunpowder

5 Bird River

6 Lower Gunpowder

7 Gunpowder River

8 Middle River

PATAPSCO RIVER AREA

9 Liberty

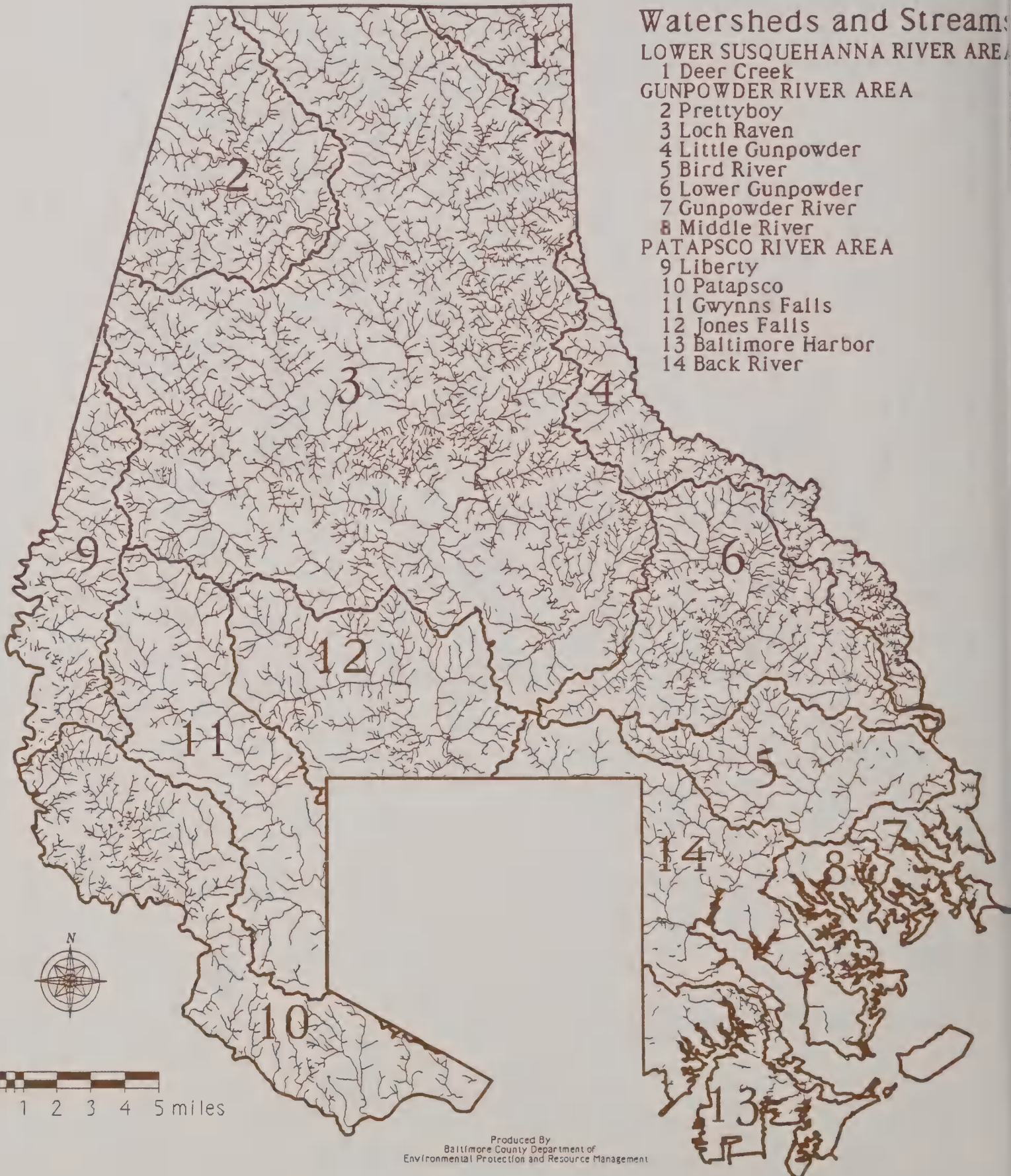
10 Patapsco

11 Gwynns Falls

12 Jones Falls

13 Baltimore Harbor

14 Back River



Produced By
Baltimore County Department of
Environmental Protection and Resource Management

EXECUTIVE ORDER

BALTIMORE COUNTY, MARYLAND

REGULATIONS FOR THE PROTECTION OF

WATER QUALITY, STREAMS, WETLANDS AND FLOODPLAINS

WHEREAS, Section 101(a) of the Federal Water Pollution Control Act Amendments of 1972 (PL 92-500), as amended by the Clean Water Act of 1977 (PL 95-217), declares that:

"The objective of this Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. In order to achieve this objective it is hereby declared that, consistent with the provisions of this Act--

- (1) it is the national goal that the discharge of pollutants into the navigable waters be eliminated by 1985;
- (2) it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983;
- (3) it is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited;
- (4) it is the national policy that Federal financial assistance be provided to construct publicly owned waste treatment works;

(5) it is the national policy that nationwide waste treatment management planning processes be developed and implemented to assure adequate control of sources of pollutants in each State;

(6) it is the national policy that a major research and demonstration effort be made to develop technology necessary to eliminate the discharge of pollutants into the navigable waters, waters of the contiguous zone, and the oceans; and

(7) it is the national policy that programs for the control of non-point sources of pollution be developed and implemented in an expeditious manner so as to enable the goals of this Act to be met through the control of both point and nonpoint sources of pollution";

WHEREAS, COMAR 26.08.02 Water Pollution - Water Quality, prohibits pollution of the waters of this State and prohibits degradation of the quality of certain waters of this State;

WHEREAS, the State of Maryland is committed to the 1987 Chesapeake Bay Agreement, the goal of which is to reduce nutrient loads entering the Chesapeake Bay by 40% by the year 2000 and is initiating implementation of Maryland's Chesapeake Bay Nutrient Reduction Plan 1985 - 2000, which calls for the establishment of forested buffer strips along stream channels adjoining cropland;

WHEREAS, the Baltimore County Department of Environmental Protection and Resource Management has received delegation from the State of Maryland for the administration of environmental programs;

WHEREAS, the Baltimore County Master Plan 1979 - 1995, calls for the protection of the natural functions of stream valleys;

WHEREAS, Baltimore County Code, Section 34-1, Reservoir Watershed; Subdivision Applications; Studies and Reports, provides for hydro-geological studies and environmental effects reports and authorizes the disapproval of any subdivision within the watershed of a public water supply reservoir if such studies and/or reports show that such is required in the interest of the protection of the watershed and the public health, safety and welfare;

WHEREAS, Baltimore County Code, Section 22-98, Floodplain and Wetland Protection, prohibits construction in or alteration of any floodplain; prohibits dredging, filling or construction in any wetland; and requires that any wetland must be adequately protected from contamination;

WHEREAS, Baltimore County Code, Section 22-100, Preservation of Natural or Historical Features, requires that natural features, including watercourses and significant vegetation, must be preserved;


WHEREAS, Baltimore County Code, Section 13-18, Notice to Abate Nuisances Generally; Failure to Obey Notice, provides for abatement of nuisances affecting health or the environment;

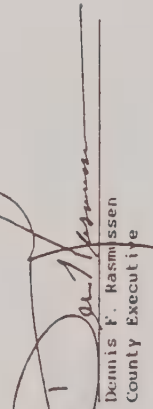
WHEREAS, Baltimore County is a signatory to the 1984 Reservoir Watershed Management Agreement which calls for Baltimore County to adopt policies to maintain vegetated buffers along streams in new subdivisions; and

WHEREAS, the Baltimore County Water Quality Steering Committee has determined that Forest Buffers are necessary to protect water quality, streams, wetlands and floodplains and has proposed regulations concerning the same;

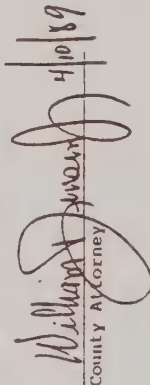
IT IS, THEREFORE, this 5th day of April, 1989 by the County Executive of Baltimore County, Maryland, ordered that the following REGULATIONS FOR THE PROTECTION OF WATER QUALITY, STREAMS, WETLANDS, AND FLOODPLAINS are hereby adopted and made effective as of 30 days from the date hereof.

WITNESS:


Robert M. Infussi, Sr.
Chief of Staff


Dennis P. Rasmussen
County Executive

REVIEWED FOR FORM
AND LEGAL SUFFICIENCY:


William J. Jernigan
County Attorney

4/10/89

REGULATIONS FOR THE PROTECTION OF WATER QUALITY, STREAMS, WETLANDS AND FLOODPLAINS

SECTION 1 - PURPOSE

The purpose of the Forest Buffer is to protect Baltimore County's streams, wetlands and floodplains; to protect the water quality of Baltimore County's watercourses, reservoirs, lakes and the Chesapeake Bay; to protect Baltimore County's riparian and aquatic ecosystems; and to provide environmentally sound use of Baltimore County's land resources. Multiple environmental protection and resource management values are provided by Forest Buffers. Forest Buffers enhance and protect: the natural ecology of stream systems; water quality; wildlife habitat; aesthetic-scenic natural features; environmentally sensitive areas, such as aquifer recharge areas; and flora and fauna preservation sites. Forest Buffers adjacent to stream systems do the following:

- a) Restore and maintain the chemical, physical and biological integrity of the water resources;
- b) Filter nutrients and toxics;
- c) Reduce erosion and control sedimentation;
- d) Stabilize stream banks;
- e) Provide infiltration of stormwater runoff;
- f) Maintain base flow of streams;
- g) Provide the organic matter that is the source of food and energy for the aquatic ecosystem;
- h) Provide tree canopy to shade streams and encourage trout and other desirable aquatic species;
- i) Provide riparian wildlife habitat;
- j) Provide scenic value and recreational opportunity; and
- k) Minimize public investment in waterway restoration, stormwater management and other water resource expenditures.

SECTION 2 - SCOPE

- a) These Regulations shall apply to all proposed development except that Section 11 of these Regulations, Design Standards for Forest Buffers and Building Setbacks, shall not apply to that development which, prior to the effective date of these Regulations:

1. Is covered by a valid, unexpired plat in accordance with Section 22-68 of the Development Regulations;
 2. Is covered by a current, executed Public Works Agreement;
 3. Is covered by a valid, unexpired building permit;
 4. Has been accepted to apply for a building permit;
 5. Has been accepted to file for CRG review; or
 6. Has been granted a waiver in accordance with Section 22-43 of the Development Regulations.
- b) These Regulations shall apply to all timber harvesting activities, unless the timber harvesting operation is implementing a Forest Management Plan approved by the Department, the Maryland Department of Natural Resources, the Baltimore County Forest Conservancy District Board, or the Baltimore County Soil Conservation District.
- c) Except as provided in Section 7 herein, these Regulations shall apply to all parcels of land, structures and activities which are causing or contributing to:
1. Pollution, including non-point pollution, of the waters of this State within Baltimore County;
 2. Erosion and sedimentation of stream channels; or
 3. Degradation of aquatic and riparian habitat.

SECTION 3 - VARIANCES

- a) The Director of the Department may grant a variance:
 1. For those projects or activities where strict compliance with the requirements of the Regulations herein would result in practical difficulty or unreasonable hardship; or
 2. For those projects or activities serving a public need where no feasible alternative is available.
- b) The applicant shall submit a written request for a variance to the Director of the Department. The application shall include specific reasons justifying the variance and any other information necessary to evaluate the proposed variance request.
- c) In granting a request for a variance, the Director of the Department may require site design, landscape planting, fencing, the placement of signs, or the establishment of water quality "best management practices" in order to reduce adverse impacts on water quality, streams, wetlands or floodplains.

SECTION 4 - AUTHORITY

The Baltimore County Department of Environmental Protection and Resource Management is responsible for enforcing the provisions of the Regulations herein.

SECTION 5 - DEFINITIONS

Agriculture: All methods of production, processing, storage and management of livestock, crops, vegetation, and soil. This includes, but is not limited to, the related activities of tillage, fertilization, pest control, harvesting, and marketing. It also includes, but is not limited to, the activities of feeding, housing and maintaining of animals such as cattle, dairy cows, sheep, goats, hogs, horses and poultry, and handling their by-products.

Agricultural Operation: Properties used for the production of agricultural products with a Soil Conservation and Water Quality Plan approved by the Baltimore County Soil Conservation District.

Best Management Practices (BMPs): Conservation practices or systems of practices and management measures that control soil loss and reduce water quality degradation caused by nutrients, animal wastes, toxics, sediment, and runoff.

Department: The Baltimore County Department of Environmental Protection and Resource Management is termed the "Department".

Development means:

- 1) The improvement of property for any purpose involving building;
- 2) Subdivision;
- 3) The combination of any two or more lots, tracts, or parcels of property for any purpose;
- 4) Subjecting property to the provisions of the Maryland Condominium Act; and
- 5) The preparation of land for any of the purposes listed in (1) through (4).

Floodplain, 100-year riverine: Means that land which is inundated by the storm water runoff created by a 100-year frequency rainfall event (which is an event which has a one percent chance of occurrence in any year) and which is based on maximum development of the watershed using the current zoning and based on the current standards approved by the Department of Public Works.

Forest Buffer: A Forest Buffer is a wooded area, including trees, shrubs and herbaceous vegetation, which exists or is established to

protect a stream system. Alteration of the natural condition of this resource is strictly limited.

Non-point Source Pollution: Pollution which is generated by diffuse land use activities rather than from an identifiable or discrete facility, and is conveyed to waterways through natural processes, such as rainfall, storm runoff, or ground water seepage rather than by direct discharge.

Pollutant:

- 1) Any waste or wastewater that is discharged from:
 - a) Any publicly owned treatment works;
 - b) An industrial source; or
- 2) Any other liquid, gaseous, solid, or other substances which will pollute any waters of this State.

Pollution: Any contamination or other alteration of the physical, chemical, or biological properties of any waters of this State, including a change in temperature, taste, color, turbidity, or odor of the waters or the discharge or deposit of any organic matter, harmful organism, or liquid, gaseous, solid, radioactive, or other substance into any waters of this State that will render the waters harmful, or detrimental, to:

- 1) Public health, safety, or welfare;
- 2) Domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses;
- 3) Livestock, wild animals, birds; or
- 4) Fish or other aquatic life.

Soil Conservation and Water Quality Plan: A plan for agricultural properties prepared by the Baltimore County Soil Conservation District to protect the productivity of the land base, preserve or enhance water quality, and conserve fish, wildlife and plant habitat, by incorporating best management practices including control of nutrients, animal wastes, toxics, sediment and run-off.

Stream Channel: A stream channel is a part of a watercourse either naturally or artificially created which contains an intermittent or perennial base flow of groundwater origin.

For the practical purpose of distinguishing stream channels with base flows of groundwater origin from watercourses with exclusively ephemeral, overland stormwater flows, any one of the following physical indicators shall be used:

- 1) Hydrophytic vegetation, hydric soil or other hydrologic indicators in the area(s) where groundwater enters the stream channel, in the vicinity of the stream headwaters, channel bed or channel banks; or
- 2) Flowing water not directly related to a storm event; or
- 3) Historical records of a local high groundwater table, such as well and stream gauge records.

Stream Order: Stream order is a classification system of streams based on stream hierarchy. The smaller the stream, the lower its numerical classification. For example, a first order stream does not have tributaries and normally originates from springs and/or seeps. At the confluence of two first order streams, a second order stream begins. Similarly, a third order stream begins at the confluence of two second order streams and so on. (See Figure 1.)

Stream System: A stream system is a stream channel together with one or both of the following:

- 1) 100-year floodplain, and/or
- 2) Hydrologically-related non-tidal wetlands.

Streams: Those perennial and intermittent watercourses identified through site inspection and as approved by the Department. The most recent Baltimore County photogrammetric maps may be used as a guide for the preliminary establishment of possible watercourses.

Surface Water Use Classes: Water uses and classes for the surface waters of Maryland are set forth in COMAR 26.08.02.01 B and consist of:

- 1) Class I: Water Contact Recreation, Aquatic Life and Water Supply Waters
- 2) Class II: Shellfish Harvesting Waters
- 3) Class III: Natural Trout Waters
- 4) Class IV: Recreational Trout Waters

Waste: Industrial waste and all other liquid, gaseous, solid, and other substances which will pollute any waters of this State.

Wastewater:

- 1) Liquid waste substance derived from industrial, commercial, municipal, residential, agricultural, recreational or other operations or establishments; and
- 2) Other liquid waste substance containing liquid, gaseous, or solid matter and having characteristics which will pollute any waters of this State.

Watercourse: Any natural or artificial stream, river, creek, ditch, channel, conduit, waterway, gully, ravine or wash, flowing in a defined bed or channel, including any area adjacent thereto, which is subject to inundation by reason of overflow of floodwater. It need not flow continuously.

Waters of this State includes:

- 1) Both surface and underground waters within the boundaries of this State subject to its jurisdiction, including that part of the Atlantic Ocean within the boundaries of this State, the Chesapeake Bay and its tributaries, and all ponds, lakes, rivers, streams, public ditches, tax ditches, and public drainage systems within this State, other than those designed and used to collect, convey, or dispose of sanitary sewage; and
- 2) The floodplain of free-flowing waters determined by the Maryland Department of Natural Resources on the basis of the 100-year flood frequency.

Wetland (non-tidal) means:

- 1) A wetland as defined in Section 1302, Title 16, of Chapter 29 of the United States Code Annotated and as described in Section 7.752.2 of Volume 7 of the Code of Federal Regulations; or
- 2) Those lands where the water table is usually at or near the surface, or lands where the soil or substrate is covered by shallow water at some time during the growing season, and which are usually characterized by one or both of the following:
 - a) At least periodically, the lands support predominantly hydrophytic vegetation; and
 - b) The substrate is predominantly undrained hydric soils.

Wetlands (tidal) means: All State wetlands and all private wetlands as defined and regulated pursuant to Title 9 in the Natural Resources Article of the Annotated Code of Maryland, and also means such additional tidal wetlands as may be identified by the Department in accordance with procedures and standards approved by the Maryland Department of Natural Resources.

SECTION 6 - PROHIBITION, ABATEMENT AND CORRECTION OF WATER POLLUTION

- a) The Department shall manage and regulate the waters of this State within Baltimore County according to the Surface Water Quality Standards and Stream Segment Classifications set forth in COMAR 26.08.02.

b) The waters of this State within Baltimore County may not be polluted by:

1. Substances attributable to sewage, industrial waste, or other waste that will settle to form sludge deposits that:
 - i. Are unsightly, putrescent or odorous, and
 - ii. Create a nuisance, or
 - iii. Interfere directly or indirectly with water uses;
 2. Any material including floating debris, oil, grease, scum, sludge and other floating materials, attributable to sewage, industrial waste, or other waste in amounts sufficient to:
 - i. Be unsightly and create a nuisance,
 - ii. Produce taste or odor,
 - iii. Change the existing color,
 - iv. Change other chemical or physical conditions in the surface waters,
 - v. Create a nuisance, or
 - vi. Interfere directly or indirectly with water uses; and
 3. High-temperature, toxic, corrosive or other deleterious substances attributable to sewage, industrial waste, or other waste in concentrations or combinations which:
 - i. Interfere directly or indirectly with water uses, or
 - ii. Are harmful to human, animal, plant, or aquatic life.
- c) The Director of the Department may order:
1. The abatement and correction of any pollution, including non-point pollution, of the waters of this State within Baltimore County;
 2. The abatement and correction of any erosion and sedimentation of stream channels, including the abatement of run-off which contributes to erosion and sedimentation of stream channels; and
 3. The abatement and correction of any degradation of aquatic and riparian habitat.

SECTION 7 - AGRICULTURAL OPERATIONS WITH APPROVED SOIL CONSERVATION AND WATER QUALITY PLANS

The Baltimore County Soil Conservation District, created by the local staff of the Soil Conservation Service, has developed a system of Best Management Practices and administrative procedures in order to adequately protect streams from agricultural impacts. In consideration of the expressed desire of the Baltimore County Soil Conservation District to administer the establishment of vegetated buffers or other water quality and stream protective measures within the agricultural areas of the County, the District shall be responsible for stream protection in agricultural operations. Agricultural operations are those properties used for the production of agricultural products with a Soil Conservation and Water Quality Plan approved by the Baltimore County Soil Conservation District. In the event that there are stream degradation problems resulting from agricultural practices, agricultural operations or the basic purposes of the Forest Buffer standards and requirements are not being met in agricultural operations, the Department shall pursue correction of these stream degradation problems in conjunction with the Maryland Department of the Environment and the Baltimore County Soil Conservation District according to the Memorandum of Understanding between the Maryland Departments of Agriculture, Health and Mental Hygiene, and Natural Resources Regarding Enforcement Procedures in Cases of Water Pollution Caused by Agriculture (December 29, 1986).

SECTION 8 - PLAN INFORMATION

In addition to the provisions of Section 22-55 of the Development Regulations, any plan submitted to Baltimore County shall contain Forest Buffers, if applicable.

SECTION 9 - APPROVAL OF PERMITS

Before the issuance of any grading permit or building permit by the Department of Permits and Licenses, or the approval of any sediment control plan, the Director of the Department, or his designee, shall determine that the proposed development is in compliance with the provisions of the Regulations herein. A permit may not be issued without compliance with the Regulations herein.

SECTION 10 - PLATS AND PROTECTIVE COVENANTS

- a) In addition to the provisions of the Development Regulations concerning plats, all plats prepared for recording and all right-of-way plats shall clearly:
 1. Show the extent of any Forest Buffer Easement on the subject property by metes and bounds;
 2. Label the Forest Buffer Easement;

3. Provide a note stating: "There shall be no clearing, grading, construction or disturbance of vegetation in the Forest Buffer Easement except as permitted by Baltimore County Department of Environmental Protection and Resource Management"; and
 4. Provide a note to reference protective covenants governing the Forest Buffer Easement.
- b) Protective covenants shall be recorded in the Land Records of Baltimore County for any Forest Buffer Easement. Any such protective covenant shall run with the land and continue in perpetuity.

SECTION 11 - DESIGN STANDARDS FOR FOREST BUFFERS AND BUILDING SETBACKS

a) Standards for Forest Buffers:

1. A Forest Buffer for a stream system shall consist of a forested strip of land extending along both sides of a stream and its adjacent wetland and floodplain. (See Figure 2.)
2. For a first or second order stream, the Forest Buffer shall be measured from the centerline. For all higher order streams, the Forest Buffer shall be measured from the stream bank of the active channel (bank-full flow). (See Figure 2.)
3. For a Class I stream, the Forest Buffer shall be the greater of the following:

- a. 75 feet,
- b. 25 feet from the outer wetland boundary, or
- c. 25 feet from the 100-year floodplain reservation or easement boundary.

(See Figures 3 and 4.)

4. For a Class III or IV stream (natural and recreational trout waters), the Forest Buffer shall be the greater of the following:

- a. 100 feet,
- b. 25 feet from the outer wetland boundary, or
- c. 25 feet from the 100-year floodplain reservation or easement boundary.

(See Figures 3 and 4.)

5. The Forest Buffer width shall be modified if there are average slopes equal to or greater than 18% which are within 150 feet of the stream and drain into the stream system. In those cases, the Forest Buffer width shall be as follows:

PERCENT SLOPE	WIDTH OF FOREST BUFFER	
	CLASS I STREAM	CLASS III, IV STREAM
10	80	100
19	90	100
20	100	100
21	110	110
22	120	120
23	130	130
24	140	140
25	150	150

The percent slope shall be determined by plotting a transect from the top of the streambank to a point 150 feet up the slope. The number of transects needed to characterize a particular stream reach will depend on the uniformity of the slopes in that reach. (See Figure 5.)

6. For slopes greater than 25%, the Director of the Department shall determine the Forest Buffer width on a case-by-case basis.
7. On those sites where forest vegetation does not exist, it is acceptable to allow the Forest Buffer to succeed naturally to a wooded state. However, if channel erosion, stream pollution or habitat degradation exists at that site or downstream from that site, the Director may require planting of the Forest Buffer and any additional water quality protection measures.

8. The Director of the Department may require posting of the Forest Buffer.

b) Standards for Building Setbacks

1. The primary or principal structure on a parcel or lot shall be setback from the outer edge of the Forest Buffer as follows:

Residential dwellings	35 feet
Commercial structures	25 feet
Industrial structures	25 feet

2. The setback can include either private or public land or both. Appurtenant or accessory structures including roads and driveways, recreational facilities, patios, etc. are permitted within the setback area.

SECTION 12 - MANAGEMENT REQUIREMENTS FOR FOREST BUFFERS

a) The Forest Buffer, including wetlands and floodplains, shall be managed to enhance and maximize the unique value of these resources. Management includes specific limitations on alteration of the natural conditions of these resources. The following practices and activities are restricted within the Forest Buffer, except as provided for in agricultural operations with a Soil Conservation Plan approved by the Baltimore County Soil Conservation District or as provided for in timber harvesting operations with a Forest Management Plan approved by the Department, Maryland Department of Natural Resources, the Baltimore County Forest Conservancy District Board, or the Baltimore County Soil Conservation District:

1. The existing vegetation within the Forest Buffer shall not be disturbed except as provided in b) below. This includes, but is not limited to, disturbance by tree removal, shrub removal, clearing, mowing, burning, spraying and grazing.
2. Soil disturbance shall not take place within the Forest Buffer by grading, stripping of topsoil, plowing, cultivating, or other practices.
3. Filling or dumping shall not occur within the Forest Buffer.
4. Except as permitted by the Department, the Forest Buffer shall not be drained by ditching, under drains, or other drainage systems.
5. Pesticides shall not be stored, used or applied within the Forest Buffer, except for the spot spraying of noxious weeds consistent with the recommendations of the University of Maryland Cooperative Extension Service.
6. Animals shall not be housed, grazed or otherwise maintained within the Forest Buffer.
7. Motorized vehicles shall not be stored or operated within the Forest Buffer, except for maintenance and emergency use.
8. Materials shall not be stored within the Forest Buffer.

b) The following structures, practices and activities are permitted in the Forest Buffer:

1. Roads, bridges, stormwater management facilities and utilities approved by the Department are permitted within the Forest Buffer provided that it is clearly demonstrated that no other feasible alternatives exist and that minimal disturbance takes place. These structures shall be located, designed, constructed and maintained to provide maximum erosion-protection, to minimize adverse effects on wildlife, aquatic

life and their habitats, and to maintain hydrologic processes and water quality. Following any disturbance, the impacted area shall be restored.

2. Stream restoration projects, facilities and activities approved by the Department are permitted within the Forest Buffer.
3. Scientific studies approved by the Department, including water quality monitoring and stream gauging, are permitted within the Forest Buffer.
4. Horticulture practices may be used to maintain the health of individual trees in the Forest Buffer.
5. Individual trees in the Forest Buffer may be removed which are in danger of falling and causing damage to dwellings or other structures, or which are in danger of falling and causing the blockage of streams.
6. Other timber cutting techniques approved by the Department may be undertaken within the Forest Buffer under the advice and guidance of the Maryland Departments of Agriculture and Natural Resources, if necessary to preserve the forest from extensive pest infestation, disease infestation or threat from fire.

SECTION 13 - CONFLICT WITH OTHER REGULATIONS

Where the standards and management requirements for Forest Buffers are in conflict with other laws, regulations and policies regarding streams, steep slopes, erodible soils, wetlands, floodplains, timber harvesting, land disturbance activities, development in the Chesapeake Bay or other environmental protection measures, the more restrictive shall apply.

SECTION 14 - PUBLIC AND PRIVATE IMPROVEMENTS OF DEVELOPMENT

In addition to the provisions of Division 3 of the Development Regulations and in accordance with the provisions of Section 6 of the Regulations herein:

- a) The applicant shall provide improvements to the Forest Buffer and stream system in order to abate and correct:
 1. Water pollution,
 2. Erosion and sedimentation of stream channels, and
 3. Degradation of aquatic and riparian habitat; and
- b) Baltimore County may participate in the cost of any such improvement.

SECTION 15 - ENFORCEMENT PROCEDURES

- a) The Director of the Department is authorized and empowered to enforce these Regulations in accordance with the procedures of this Section.
- b) If, upon inspection or investigation, the Director or his designee is of the opinion that any person has violated any provision of these Regulations, order or permit condition promulgated or issued under these Regulations, he shall with reasonable promptness issue a correction notice to the person, on such form as prescribed and approved by the Director. Each such notice shall be in writing and shall describe with particularity the nature of the violation, including a reference to the provision of these Regulations, order or permit condition alleged to have been violated. In addition, the notice shall fix a reasonable time for the abatement and correction of the violation.
- c) If, after the time fixed for abatement and correction of the violation has expired pursuant to b) above, an inspection by the Director or his designee determines that the violation or violations continue, the Director shall issue a citation by certified mail to the person who is in violation on such form as prescribed and approved by the Director. Each citation shall be in writing and shall describe with particularity the nature of the violation, including a reference to the provision of these Regulations, order or permit condition alleged to have been violated, and include the penalty, if any, proposed to be assessed pursuant to Section 16 of these Regulations, and that the person so charged has thirty (30) days within which to contest the citation or proposed assessment of penalty, if any, to file a request for a hearing with the Director, said hearing to be held before the Director or his designee. At the conclusion of said hearing, the Director or his designee shall issue a final order, subject to appeal to the Board of Appeals of Baltimore County. If, within thirty (30) days from the receipt of the citation issued by the Director the person fails to contest the citation or proposed assessment of penalty, if any, the citation and the assessment, if any, as proposed shall be deemed a final order of the Director.

SECTION 16 - CIVIL PENALTIES

- a) Any person who violates any provision of these Regulations, order or permit condition promulgated pursuant to these Regulations may be assessed a civil penalty not to exceed One Thousand Dollars (\$1,000) for each violation with each day's continuance considered a separate violation.
- b) The Director of the Department shall have the authority to assess all civil penalties set forth in these Regulations, giving due consideration to the business of the person being charged, the gravity of the violation, the good faith of the person, and the person's history of previous violations.

- c) Included with the citation as issued pursuant to Section 15 shall be included instructions for the payment of any assessment levied by the Director together with a notification that, upon certification to the Director of Finance, the assessment shall constitute a lien on the property owned by the person found to be in violation hereof and shall be collectible in the same manner and to the same extent as taxes.

SECTION 17 - APPEALS

- a) Any person found to be in violation by the Director may appeal from the final order issued by the Director or his designee to the Board of Appeals of Baltimore County within thirty (30) days after the date of such final order.
- b) The County shall be a party to all such appeals, and copies of the notice of appeal and petition shall be served on the Director of the Department and the County Attorney.

SECTION 18 - CRIMINAL PENALTIES

- a) Any violation of these Regulations, order or permit conditions promulgated pursuant to these Regulations shall be a misdemeanor and punished by a fine of not more than One Thousand Dollars (\$1,000) or by imprisonment for not more than Ninety (90) days, or by both. Any person who shall violate such Regulations, order or permit conditions promulgated pursuant to these Regulations shall be deemed guilty of a separate offense for every day that such violation shall continue.
- b) Whoever knowingly makes any false statement, representation or certification in any application, record, report, plan or other document filed or required to be maintained pursuant to these Regulations shall, upon conviction, be punished by a fine of not more than One Thousand Dollars (\$1,000) or by imprisonment for not more than thirty (30) days, or by both. Such violation shall be a misdemeanor.

SECTION 19 - LIABILITY FOR EXPENSES CAUSED BY VIOLATION

Any person violating any of the provisions of these Regulations, order or permit conditions promulgated pursuant to these Regulations, may be liable for any costs, or expenses incurred as a result thereof by Baltimore County.

SECTION 20 - ADDITIONAL REMEDIES FOR VIOLATION

In addition to any other sanction under these Regulations, a person who fails to comply with the provisions of these Regulations pertaining to forest buffers, stream systems and water pollution shall be liable to

Baltimore County in a civil action for damages in an amount equal to twice the cost of restoring the Forest Buffer, stream system and water quality as determined by the Department.

Any damages that are recovered in accordance with this Section shall be used as follows:

1. For the restoration of Forest buffers, stream systems and water quality, or
2. For the administration of the Department's program for the protection and restoration of water quality, streams, wetlands and floodplains.

SECTION 21 - SEVERABILITY

If any section, subsection, sentence, clause, phrase or portion of these Regulations is, for any reason, held invalid or unconstitutional by any court of competent jurisdiction, such portion is deemed a separate, distinct and independent provision; and such holding does not affect the validity of the remaining portion of these Regulations. It is the intent of Baltimore County, Maryland, that these Regulations would have been enacted notwithstanding the invalidity of any section, subsection, sentence, clause, phrase or portion thereof.

SECTION 22 - EXHIBITS

Figure 1 - Stream Order Hierarchy

Figure 2 - Stream Buffer, Small Streams and Larger Streams

Figure 3 - Wetland Buffer for a Small, Class I Stream

Figure 4 - Floodplain Buffer for a Large, Class I Stream

Figure 5 - Buffer Expansion for Steep Slopes

Figure 6 - Example A: Forest Buffer for a Small, Class III Stream with Wetlands

Figure 7 - Example B: Forest Buffer for a Large, Class I Stream with Floodplain

Class I Stream with Floodplain

Figures 2, 3, 4 and 5 illustrate specific aspects of the Design Standards for Forest Buffers and Building Setbacks, which relate to streams, wetlands, floodplains and steep slopes, respectively. Figures 6 and 7 present two different sites conditions and the determination of the required Forest Buffer for each.

THE FOREST BUFFER CONSISTS OF THE GREATER OF THE:

- STREAM BUFFER,
- WETLAND BUFFER,
- FLOODPLAIN BUFFER, OR
- BUFFER EXPANSION FOR STEEP SLOPES.

FIGURE 1
STREAM ORDER HIERARCHY

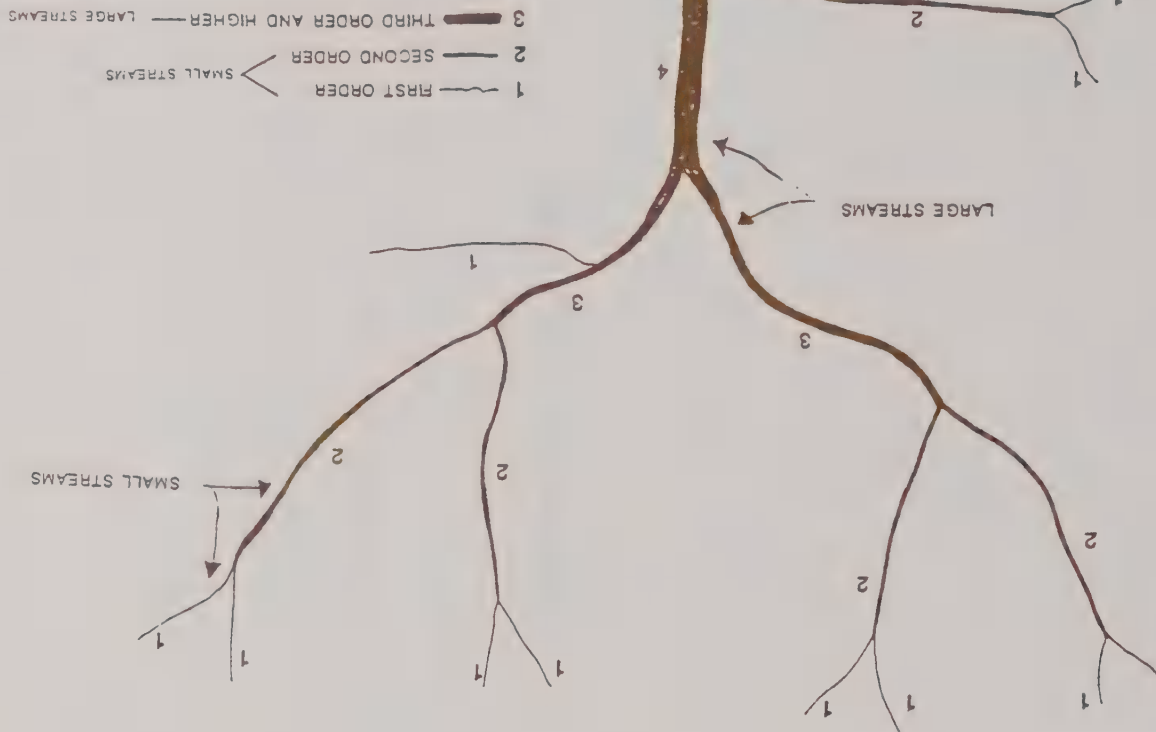
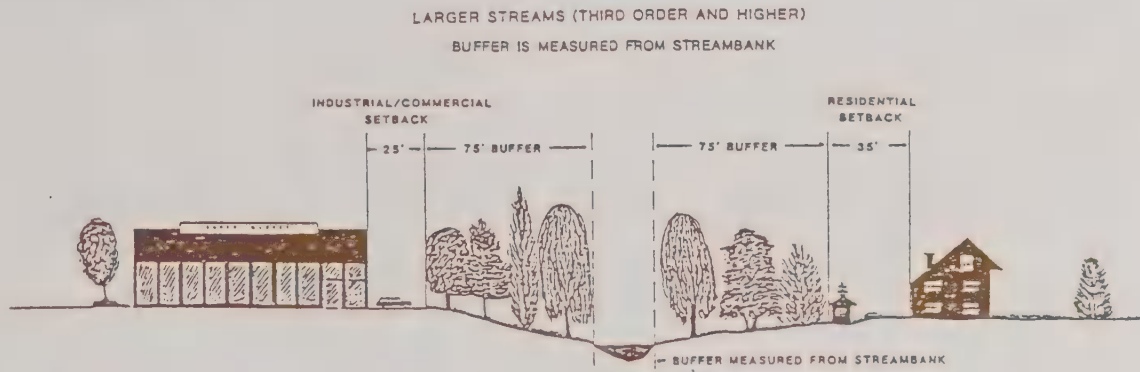
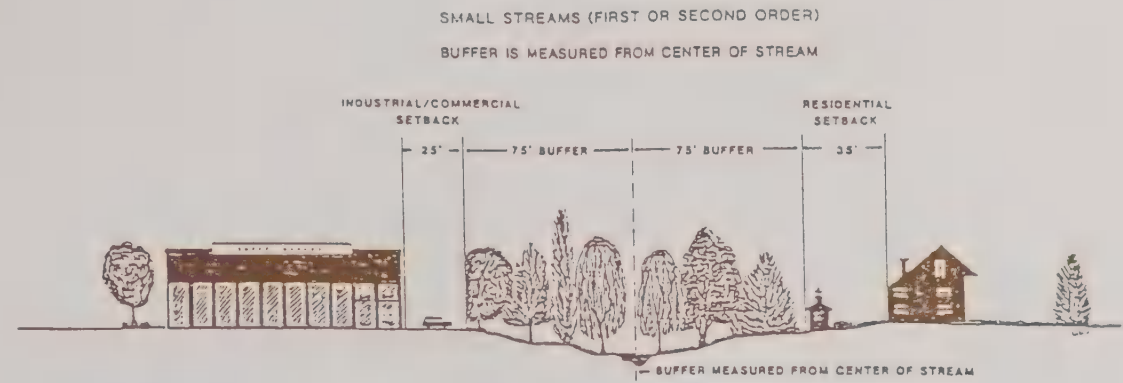


FIGURE 2
STREAM BUFFER



NOTE: FOR TROUT STREAMS (CLASS III & IV), STREAM BUFFER IS INCREASED FROM 75' TO 100'

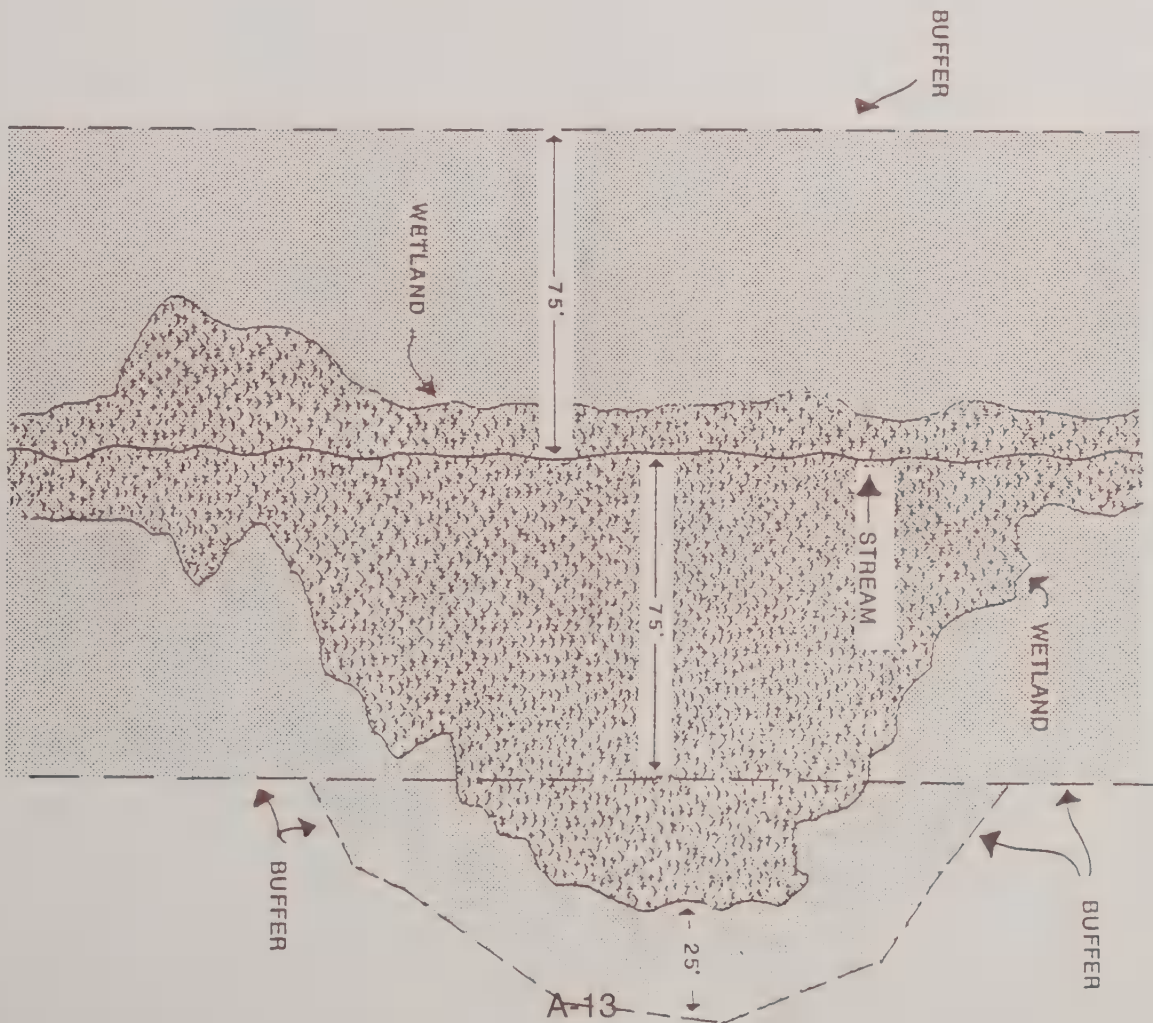


FIGURE 3
WETLAND BUFFER
FOR A SMALL, CLASS I STREAM
BUFFER CONSISTS OF EXTENT OF WETLAND PLUS 25'
OR 75' (WHICHEVER IS GREATER)

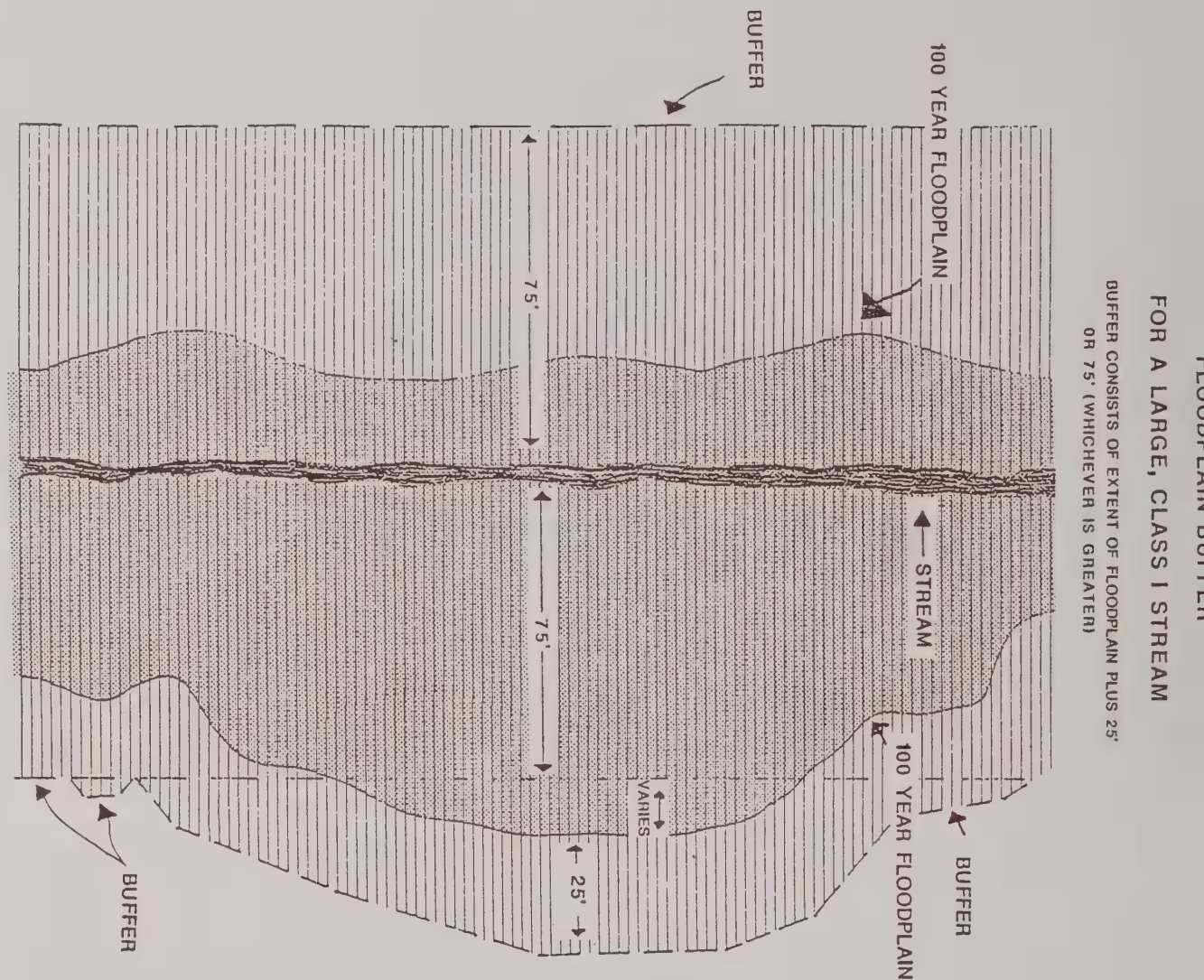
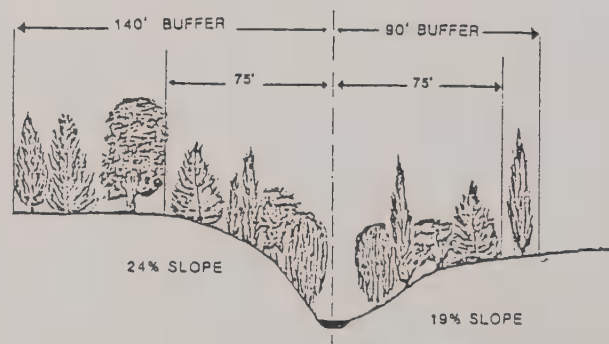


FIGURE 5
BUFFER EXPANSION FOR STEEP SLOPES

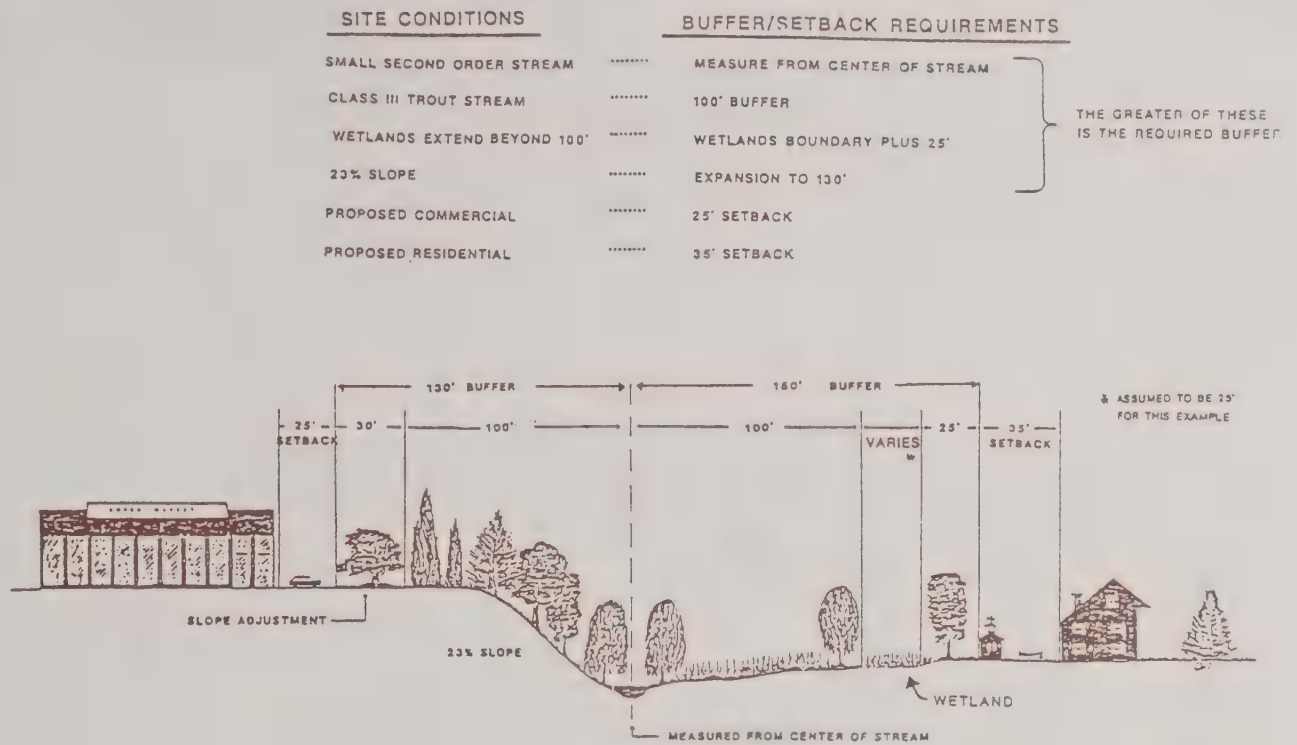


SMALL STREAMS (FIRST OR SECOND ORDER)
CLASS I
BUFFER MEASURED FROM CENTER OF STREAM

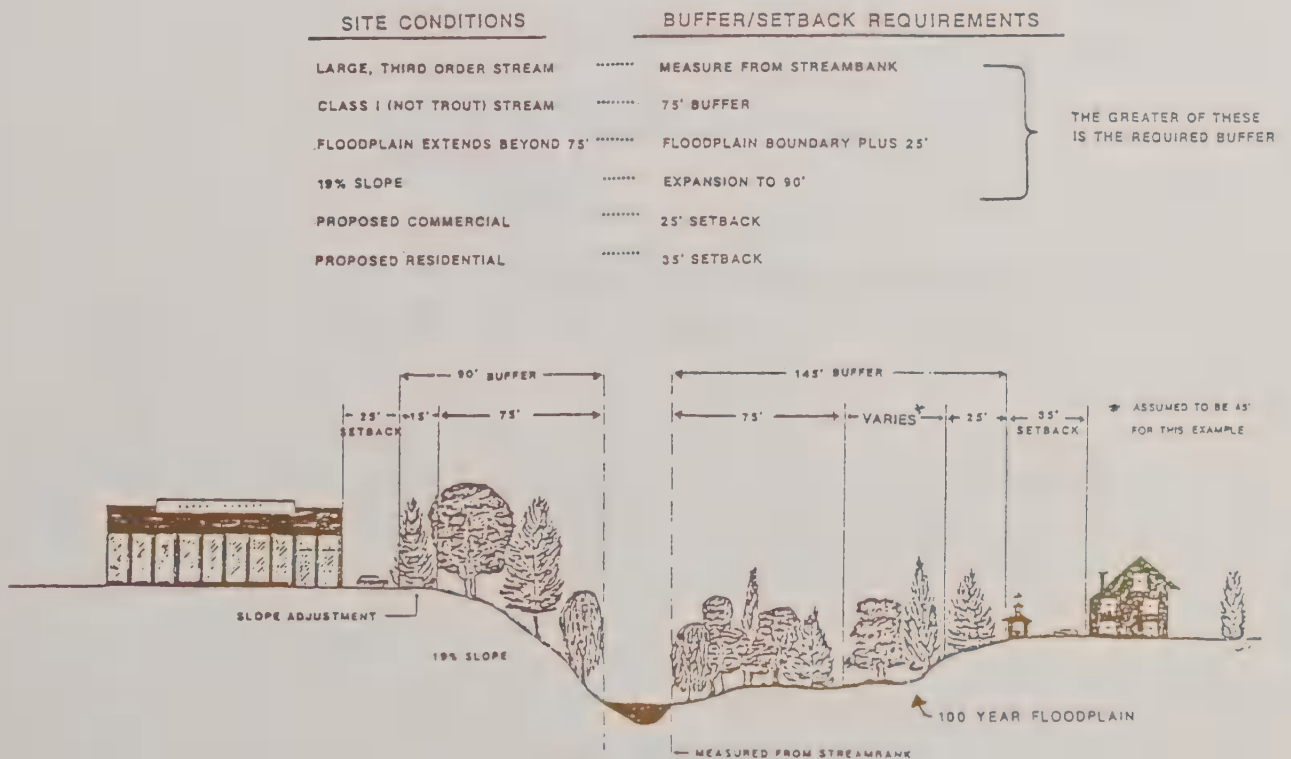
AVERAGE SLOPE %	CLASS I BUFFER WIDTH	CLASS III & IV BUFFER WIDTH
18	80	100
19	90	100
20	100	100
21	110	110
22	120	120
23	130	130
24	140	140
25	150	150

NOTE: 1) FOR LARGER STREAMS (THIRD ORDER AND HIGHER), THE BUFFER IS MEASURED FROM THE STREAMBANK.
2) FOR SLOPES GREATER THAN 25%, THE DIRECTOR OF THE DEPARTMENT SHALL DETERMINE THE BUFFER WIDTH ON A CASE-BY-CASE BASIS.

EXAMPLE A



EXAMPLE B

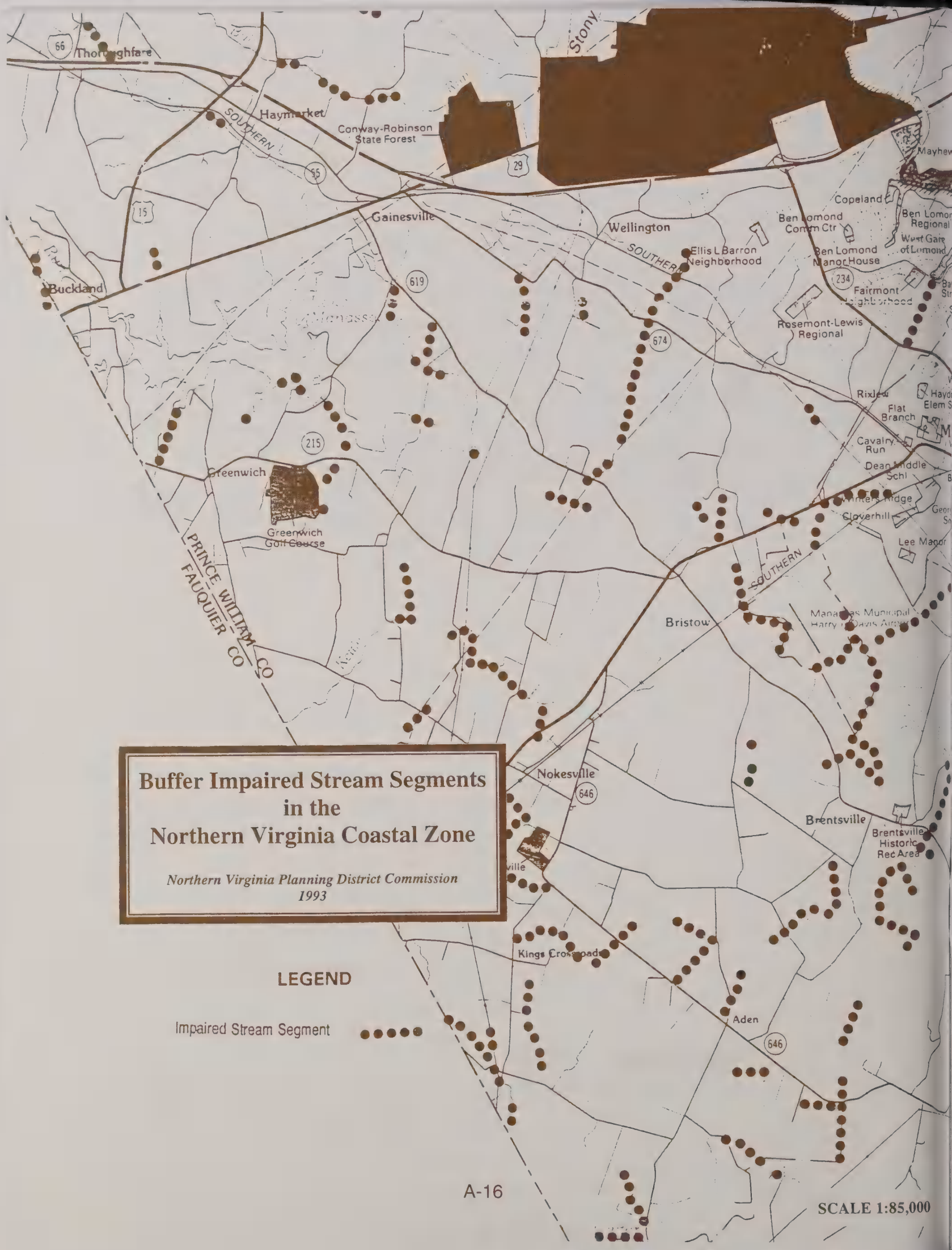


**Buffer Impaired Stream Segments
in the
Northern Virginia Coastal Zone**

*Northern Virginia Planning District Commission
1993*

LEGEND

Impaired Stream Segment





What Is A Riparian Area?

Riparian refers to the area where water and land meet and is the zone bordering streams, ponds, or lakes. It is an extremely valuable area for many kinds of wildlife and provides both hiding and nest cover. A good riparian area may consist of trees, shrubs or grasses, and may be adapted to complement the adjacent land use.

The picture on the left depicts a healthy riparian forest buffer that limits livestock access, provides hiding and nesting cover for wildlife, and improves water quality that benefits public health, recreational use, and aquatic life.

This placemat was prepared by the following groups who invite inquiries for technical help:

West Virginia Division of Natural Resources, Wildlife Section (Fisheries)

USDA Soil Conservation Service

Hampshire County Extension Homemakers

Pine Cabin Run Ecological Lab

County Planning Commission

USDA Agricultural Stabilization Conservation Service

West Virginia University Extension Service

West Virginia

West Virginia Soil & Water Conservation Districts

Polomac Headwaters Resource Conservation & Development

Partially funded by: Water Resources Section, West Virginia Division of Forestry and
West Virginia University Extension Service

© 1992 Riparian Task Force

Why Are Riparian Areas Important?

Most landowners are responsible stewards. They reject practices that damage land, wildlife habitat, and water quality.

Removal of natural streamside vegetation by man or livestock decreases shading, thereby increasing water temperature. Increased water temperature and excess silt in streams is harmful to fish and other aquatic life. Lack of protective streamside vegetation also speeds bank erosion and eliminates cover and nesting areas for wildlife.

Pollution entering streams from septic systems and animal waste may increase algae growth and the incidence of water borne disease.

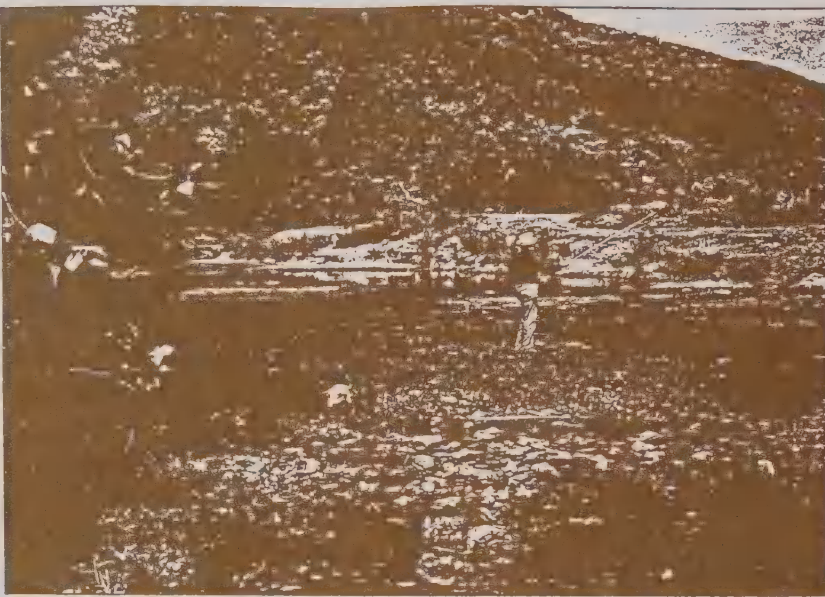
Proper management practices should be followed in crop, livestock and timber production, as well as building and road construction, to prevent damage to stream banks and water quality.

Awareness and Planning Bring Healthy Streams!

The health of a stream depends on the condition of the land and vegetation along its banks. These streamside areas called *riparian zones* are important because they:

- ◆ reduce streambank erosion
- ◆ enhance fish habitat by shading the water
- ◆ contribute leaves and other organic material to the stream's food chain
- ◆ slow flood waters so nutrient rich sediments are deposited on the floodplain
- ◆ filter out chemical, sediment, and animal waste pollutants
- ◆ increase diversity of wildlife by providing food, shelter, and protection

These valuable systems need our help.



Healthy streams promote recreation.

Jim Holmes - photographer

Forestry

Did you know that properly managed forest land promotes clean, healthy streams? Water that flows through undisturbed or well-managed forest land is low in sediments and other pollutants. Forests reduce flood hazards and contribute to consistent stream flow.

Cutting trees does *not* cause soil erosion—it is caused by water running across access roads, skid trails, and log landings. If roads, trails, and

landings are located properly, and if water control features, such as buffer strips, are used, water quality will be protected.

◆ Plan roads, skid trails, and landings as far away from streams as possible.

◆ Maintain buffer strips. This is a corridor of forest land or potential forest land, that lies between exposed soil and a waterway. Usually 75- to 100-foot wide, buffers trap soil particles and pollutants before they reach a stream. The buffer strip also shades streams, keeping water cooler for fish. Harvested trees should be winched from the corridor to minimize soil disturbance.

◆ Install water-diversion devices such as wide water bars or broad-based dips in haul roads and landings to divert run-off into buffer strips.

◆ Stabilize exposed soil in the riparian zone. After completing any activity that disturbs the soil, immediately seed and mulch exposed areas to reestablish permanent vegetative cover.

◆ Inquire about the Stewardship Incentive Program (SIP). SIP-6 (Riparian and Wetland Protection and Improvement) and SIP-7 (Fisheries Habitat Enhancement) are designed to protect, restore, and improve waterways and fisheries habitat.

Maintaining a healthy, well-managed forest along waterways is the best way to ensure good water quality.



Wide water bar



Properly reseeded forest road

Agriculture

Silt, or fine particles of soil suspended in water, occurs in varying degrees in all waterways. In agricultural areas, excess silt comes from both overland run-off of unprotected fields and erosion of mismanaged streambanks. Where water flow is slow, excess silt fills stream channels and increases the chance of flooding. Silt also interferes with the feeding and reproduction of fish and aquatic insects.

Riparian buffer strips intercept silt carried by run-off. Forest and grassland buffers also filter phosphorus and nitrogen originating from agricultural practices, animal waste, and fertilizers. Excesses of these nutrients cause algal blooms and depressed levels of dissolved oxygen, which stress fish and aquatic insects. Without trees, grasses, and shrubs along the streambank to absorb and filter pollutants, water quality suffers, especially during heavy rainfall.

One cause of streambank erosion is the unrestricted access of livestock to streams. Livestock can trample the banks and overgraze protec-



Before: This lack of streambank vegetation was caused by unrestricted livestock use.



After: Fencing livestock out of the riparian area resulted in this natural revegetation after one year.

tive vegetative cover. Fencing allows a succession of grasses, shrubs, and trees to develop into a valuable riparian forest buffer. Streambanks then become more stable. We can speed succession along streams by planting trees and shrubs. Alternatives for watering livestock can be provided through various cost-share programs.

In conjunction with good agricultural practices, riparian forest buffers enhance water quality as well as fish and wildlife habitat.

Land Development

Development activities adjacent to streams have profound effects on water quality and stream health. If you own property along a waterway, your activities could affect water quality.

Lack of vegetation around developments and individual homes increases sediments and nutrients in streams. These problems impact municipal water treatment costs, which increases your water and sewage treatment payments.

Riparian forest buffers provide safety from flooding and protect streams from nearby development, stormwater run-off, lawn chemicals, high water temperatures, and sedimentation. Buffers increase value to a property by adding individuality, beauty, and privacy. They also attract birds and wildlife, and screen out noise and air pollution.

Buffers save utility costs. Trees reduce cooling costs in summer and heating costs in winter. Trees increase property values, too; realtors may add up to 25 percent to the value of a home because of trees on the property.

The combined effect of building roads and homes along a waterway can degrade the quality of both groundwater and surface water.



Residential development with riparian buffer

Therefore, stabilizing the soil is critical. Where possible, retain existing vegetation. Plant trees, shrubs, grasses, and other ground cover that thrive in riparian areas. These precautions will reduce soil loss and trap chemicals from lawns. This effort will add comfort, aesthetics, and value to your waterfront property.



Flood plain residence unprotected by riparian buffer. Even though this cabin has been elevated out of the flood plain, the continued erosion of the river bank will eventually undermine its foundation!

Contacts

Assistance in installing and enhancing a riparian forest buffer is available through the following agencies:

U.S. Department of Agriculture
Soil Conservation Service
500 E. Main Street
Romney, WV 26757
304-822-5902

West Virginia Division of Forestry
1 Depot Street
Romney, WV 26757-1400
304-822-4512

West Virginia University Extension Service
P.O. Box 1880
Romney, WV 26757-1880

Hampshire County Planning Commission
Planning Director
P.O. Box 883
Romney, WV 26757
304-822-7018

Potomac Valley Soil Conservation District
500 East Main Street
Romney, WV 26757-1836
304-822-5174

Pine Cabin Run Ecological Laboratory
Route 1, Box 460
High View, WV 26808

Eastern Panhandle Soil Conservation District
1450-3 Edwin Miller Blvd.
Martinsburg, WV 25401
304-263-4376

04362

THIS DEED OF GIFT OF EASEMENT is entered into this
 day of _____, by and between _____ and
 _____, husband and wife, Grantors, and the
 HEADWATERS SOIL AND WATER CONSERVATION DISTRICT, Grantee:

- - W I T N E S S E T H - -

WHEREAS, the parties to this deed recognize the need
 to promote and assure the protection of the riparian zone as
 a means of water quality preservation and desire to improve
 and maintain wildlife habitat along Middle River and its
 tributary, Christian's Creek; and,

WHEREAS, The Virginia Conservation Easement Act,
 Section 10.1-1009 et seq of the Code of Virginia (1950), as
 amended, contemplates the creation of nonpossessory
 interests in real estate for the purposes of maintaining or
 enhancing water quality; the Virginia Open-Space Land Act,
 Section 10.1-1700 et seq of the Code of Virginia (1950), as
 amended, defines land held for conservation purposes as
 open-space land and provides that public bodies may acquire
 interests in land for those purposes; and Section 10.1-547
 of the Code of Virginia (1950), as amended, authorizes the
 acquisition of easements for those purposes by the grantee;

NOW THEREFORE, in consideration of the foregoing and in
 consideration of the mutual covenants herein and the
 acceptance hereof by the grantee, the grantors do hereby

GRANT and CONVEY unto the grantee a riparian easement as described herein over the following parcel of real estate;

All of that certain parcel of unimproved land lying on the waters of Christian's Creek northeast of the City of Staunton in Wayne Magisterial District, Augusta County, Virginia, containing 24 acres more or less, which may more particularly be described by reference to the Flood Hazard Area map dated August 1975 which is attached hereto as Exhibit "A", and on which the tract subject to this easement has been cross hatched and is depicted as a portion of the 100-year flood area lying within boundaries of the grantors' farm. A copy of a portion of the USGS Fort Defiance quadrangle topographic map illustrating the location of the tract in relation to State Route 794 is attached as Exhibit "B". This parcel of land is referred to in the covenants of this deed as the "riparian zone."

The described parcel is a portion of a ninety-nine acre tract acquired by _____ by deed from _____

dated October 21, 1988, of record in the Office of the Clerk of the Circuit Court for Augusta County, Virginia, in Deed Book 950 at page 774, and by will of Annie M. Harris, which is of record in the aforesaid Clerk's Office in Will Book 229 at Page 169. A complete description of the boundaries of the farm is of record in the aforesaid Clerk's Office in Deed Book 245 at page 434.

The map attached as Exhibit "A" is a portion of sheet six of eight included in the booklet Flood Hazard Analyses Christians Creek, Augusta County, Virginia, prepared by the U.S. Department of Agriculture Soil Conservation Service dated 1976.

This easement is granted in perpetuity to the grantee and its successors as may be determined by modification of the enabling statutes cited herein. This easement may be assigned by the grantee or its successors only with the consent of the grantors or their successors. The covenants and restrictions herein recited shall be binding on the successors and assigns of both the grantors and the grantee.

The grantors hereby covenant that the following restrictions shall be observed in their use of the described riparian zone:

1. The grantors shall cooperate with the grantee in the development and implementation of a mutually agreeable management plan for the tract subject to this easement. This plan shall implement sound practices of soil, water, timber and wildlife resource management. This cooperation shall include allowing reasonable access to the property for inspection and implementation by the grantee, provided that permission for such access shall be specifically requested of and granted by the grantors.

2. No dwellings, barns, outbuildings, or structures shall be built in the riparian zone.

3. The accumulation of trash or refuse in the riparian zone occasioned by the grantors is prohibited. It is understood that poor management practices in the rest of the watershed inevitably result in the deposit of trash in the

riparian zone by floodwaters, and the grantors are under no affirmative obligation to continually remove such debris.

4. Livestock will be excluded from the streambanks of Christians Creek by an adequate fence established and maintained by the grantors. Two appropriately protected watering points will be established as part of the reclamation project and maintained and used in accordance with the management plan.

5. The production of annual crops in the raparian zone will be limited to an acreage and rotation consistent with the management plan.

6. Pasturage and livestock feeding operations in the raparian zone will be limited in accordance with the carrying capacity of the established sod, conservation of the soil, and preservation of water quality as outlined in the management plan.

7. Logging will be permitted in accordance with the mutually developed plan with the further requirement that coordination with the Headwaters Soil and Water Conservation District shall be required before harvesting any timber within fifty feet of the streambanks.

8. Vehicular crossing of the stream shall be limited to one crossing point, which as a part of the reclamation project shall be graded to accommodate tractors, wagons,

balers and other farm equipment needed on the opposite side of Christians Creek.

The grantee covenants that it will exercise this easement on the following terms:

1. The grantee shall cooperate with the grantors in the development and implementation of a mutually agreeable management plan for the tract subject to this easement. This plan shall implement sound practices of soil, water, timber and wildlife resource management.

2. The grantee shall, in the event such programs are available, assist the grantors in obtaining funding for reclamation of the badly eroded streambanks by grading, seeding and reforestation.

3. The grantee shall, subject to any limitation imposed by its enabling legislation, assist the grantors in documenting such portions of the management plan as may be necessary in order to obtain funding, if available, for the implementation of that plan, including but not limited to access to water for agricultural purposes and repairs to fencing or vegetation occasioned by flooding.

4. Although this easement will benefit the public, nothing herein shall be construed to grant any right of public use or right of public access to the subject property from either the public road or from the waters of Christians Creek. Except as required to supervise, inspect, and

control such limited access to the waters of Christians Creek as may be allowed to the grantors for the purpose of watering livestock, this easement does not convey to the grantee any right of access to the property without the consent of the grantors. It is anticipated that at least an annual inspection by the conservation district or its agents will be scheduled.

This conveyance is made expressly subject to the easements, conditions, restrictions and reservations contained in duly recorded deeds, plats and other instruments constituting constructive notice in the chain of title to the property hereby conveyed, which have not expired by limitation of time contained therein or otherwise become ineffective.

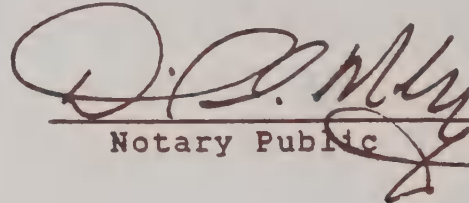
WITNESS the following signatures and seals.

DAVID I. McCASKEY
ATTORNEY AT LAW
P. O. BOX 1134
AUNTON, VA 24402-1134
75-3076

STATE OF VIRGINIA,

AT LARGE:

The foregoing instrument was acknowledged before me in
the ~~City~~ County of Augusta, Virginia, this
19th day of APRIL, 1994,


Notary Public


My Commission Expires:

30 AUGUST 1995

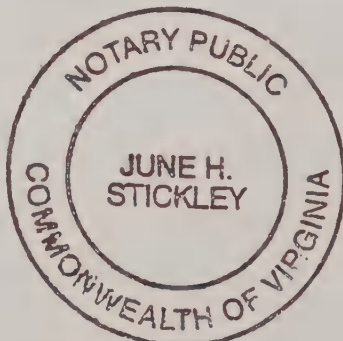
STATE OF VIRGINIA,

AT LARGE:

The foregoing document was acknowledged before me in
the City/County, Virginia, this 18 day of April,
1994, by


Notary Public

My Commission Expires:



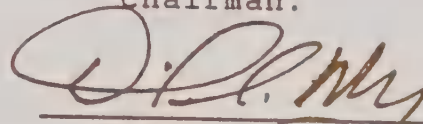
My Comm. Exps.
June 30, 1998

STATE OF VIRGINIA,

AT LARGE:

The foregoing document was acknowledged before me in
the ~~city~~ County of Augusta, Virginia, this 19th
day of April, 1994, on behalf of HEADWATERS SOIL
AND CONSERVATION by

Chairman.


Notary Public

My Commission Expires:

30 August 1995

This Deed of Gift is exempt from all Virginia
recording taxes pursuant to Section 58.1-811 A (3) and
Section 58.1-811 D of the Code of Virginia (1950), as
amended.

100' 100'

1.

Edge of Resource Protection Zone

2.

Edge of Resource

3.

4.

5.

6.

A-28

- ### Legend

100-Year Floodplain

Wetlands and
25' State Buffer

Steep slopes ($>15\%$)

5-1001

Purpose and Intent. The Scenic Creek Valley Buffer is established to govern the construction of buildings, structures, parking, and other impervious surfaces in areas adjacent to scenic rivers and major stream areas draining greater than 640 acres, by providing for a setback area from the channel scar line in which construction of improvements would not occur except as set forth below. The intent is to (1) promote water quality and the preservation of significant environmental resource areas, wildlife habitat and corridors, and native vegetation areas; (2) protect and enhance water and groundwater recharge processes by protection of the natural capacity of vegetative areas along rivers and creeks to filter and purify storm water runoff; (3) protect aquatic environments from the warming effects of solar radiation by preserving riparian tree canopy cover; (4) promote tourism and high quality corporate investment by maintaining to the extent reasonably possible, existing high water quality; (5) to maintain the scenic beauty of the streams of Loudoun County; and (6) implement the Comprehensive Plan.

5-1002

Scenic Creek Valley Buffer Established. The following setbacks are established along scenic rivers and major streams in areas where the major 100 year floodplain is less than the setbacks provided below.

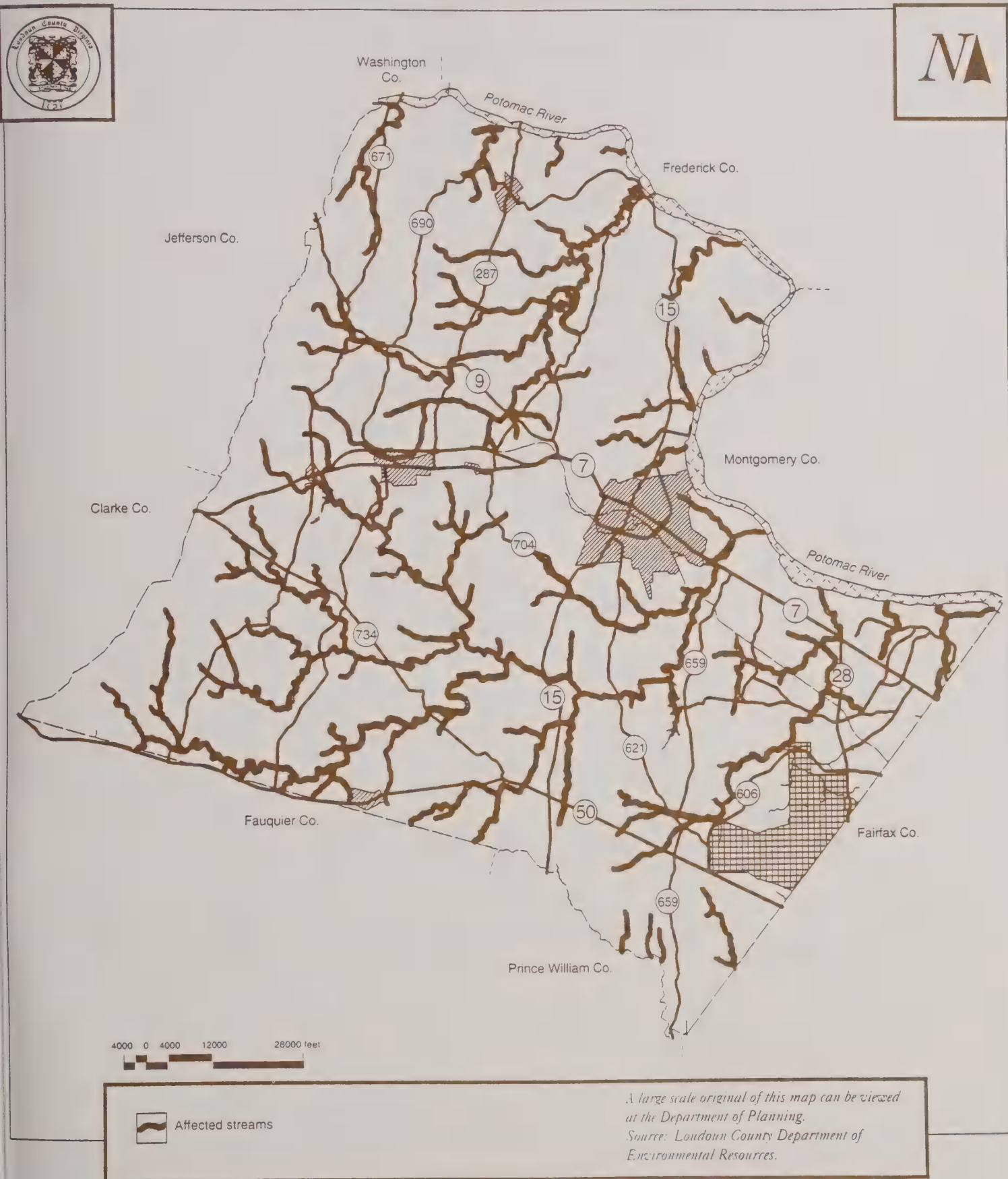
- (A) 250 feet measured along the slope of the ground from the channel scar line on the Potomac River.
- (B) 200 feet on each side of the creek measured along the slope of the ground from the channel scar line of the Scenic River designated portions of Goose Creek and Catoctin Creek.
- (C) 150 feet on each side of the creek measured along the slope of the ground from the channel scar line of each creek or stream where the watershed is greater than 640 acres.
- (D) The above setbacks may be reduced as follows:
 - (1) A reduction of 100 feet shall be allowed for the retention of an existing forested area or the creation of a forested area, as approved by the Area Forester as part of a management plan which may not constitute reforestation of an existing area, between the ultimate setback line and the channel scar line; or
 - (2) A reduction of 100 feet shall be allowed for the use of and retention of stormwater management/BMP practices in

accordance with the FSM at time of development within any developed area on the lot or site.

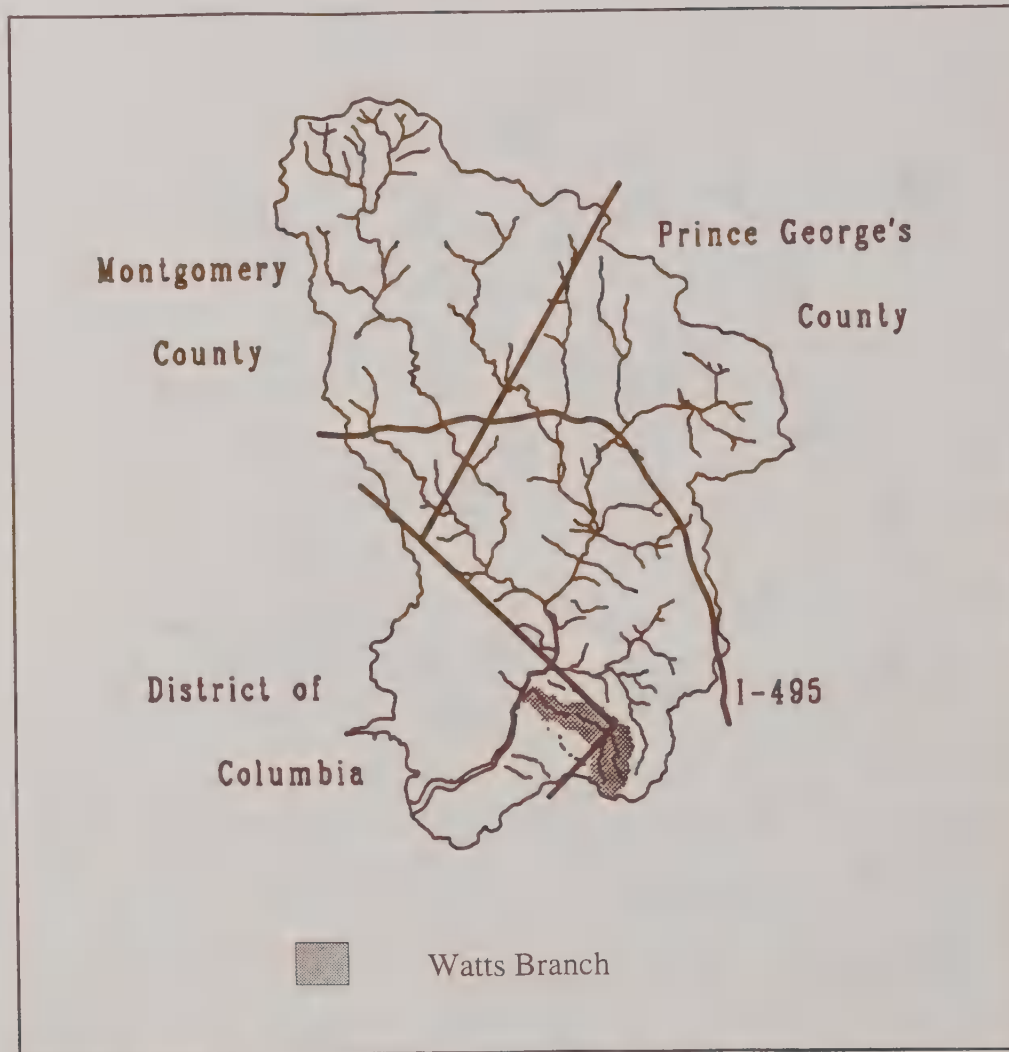
- (E) The above setback does not apply to agricultural, horticultural, or forestal uses where a farm plan approved by the Loudoun County Soil and Water Conservation District or other County approved agency is kept continuously in place.

- 5-1003** **Effect of Buffer.** The construction of buildings, structures, parking lots, or other impermeable surfaces within the Scenic Creek Valley Buffer is prohibited, except as stated herein. Existing buildings and structures within the Scenic Creek Valley Buffer are not considered nonconforming, i.e., they can be added to and, if destroyed by fire or casualty, they can be rebuilt to the same or an equivalent footprint. This buffer or setback area does not regulate uses within the setback area, although the County encourages the growth, through plantings or natural succession, of vegetative and forestal cover within the Scenic Creek Valley Buffer area.
- 5-1004** **Existing Lot Criteria.** On any existing lot of record at the time of the adoption of this Ordinance or any parent tract (or lot) designated on any future subdivision plat, one (1) single family residence and its attendant unpaved driveway, unpaved parking area, and/or detached garage and incidental structures cited in Section 4-1500 shall be permitted within the setback area.
- 5-1005** **Development Criteria.** The Scenic Creek Valley Buffer is not intended to, and shall not, limit development density (gross floor area or units per acre) otherwise allowed on land within the Scenic Creek Valley Buffer area. The Scenic Creek Valley Buffer shall be administered like any other setback provided for in this Ordinance in allowing otherwise developable land within the setback area to be counted for density computation purposes and applied toward the construction of improvements outside the setback area. Road crossings and driveways, shall be permitted subject to applicable federal and state regulations, to this Ordinance, and to such performance standards as may be contained in the Facilities Standards Manual.

FIGURE 9: STREAMS AFFECTED BY STREAM CORRIDOR AND SCENIC RIVER BUFFERS



The Anacostia Watershed



From: Warner, et al. (in review). *Existing Source Assessment: Land Use and Sources of Pollution in the Anacostia Watershed*. MWCOG.

Map of Watts Branch Subwatershed

Fairfax County Hydrologic Units



9. No refuse (grass clippings, leaves, Christmas trees, old sofas, etc.) is discarded onto these lands. Crank case oil can be recycled.

10. Horseback riding is confined to designated natural surface trails.

11. Fires are started only where suitable facilities are available.

12. Residents use fish conservation guidelines, returning to the lakes all bass between 11-14 inches so these adults can reproduce. Please remove all bluegills of any size so they don't overpopulate the lake.

13. Residents keep storm drains, ditches, and gutters free of debris (such as leaves and trash) and chemicals (such as anti-freeze, motor oil, and detergent) which might flow through the drainage system into a lake or stream.

14. Use of motor vehicles is considered a trespass on Association property except for such use as may be necessary for maintenance and construction purposes.

All residents are asked to comply with this prohibition against the use of motor vehicles on the pathways and common lands, and to advise the Fairfax County Police and the Association office of any violations.

GUIDELINES

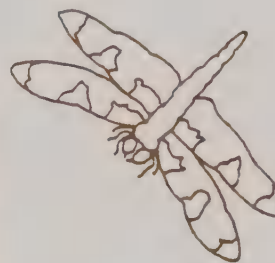
FOR THE

CARE AND USE

OF

RESTON ASSOCIATION'S

NATURAL AREAS



The natural areas are an essential part of the Reston concept, and a great asset for the members of the Association and their families. These lands were permanently set aside to maintain the natural beauty of the areas, create natural buffers between residential and commercial areas, and provide recreation and education for those interested in plants and wild life. They were established, not only for those living here today, but also for those who will come to Reston in the future.

The preservation of these lands depends primarily on the cooperation of every resident, and is only partially ensured through the activities of the Association and the efforts of the Developer.

Concrete boundary markers are installed to mark the Reston Association property. These lands are freely accessible to all Reston residents.

These lands are:

- Owned by the Association.
- Maintained with dues paid to the Association.
- Provided for the enjoyment and benefit of all residents and visitors.

Each resident is urged to:

- Make suggestions for the use and development of the common lands.
- Donate, after approval from the Open Space Department, plants or man-made facilities for the common land.

Our investment can be enhanced, and maintenance costs kept at a reasonable level if these care and use guidelines are followed:

1. The natural areas are preserved in their intended state. Wooded areas are left natural. The Association mows meadows in the early spring. Landscaped areas are weeded and mulched annually.
2. No foreign plants or animals are introduced, especially plants that are a maintenance problem, such as bamboo, ivy, etc.
3. All plants, topsoil, humus and down wood are left undisturbed.

4. No pets are allowed to run free.*
5. No invisible fences are allowed on Association property.
6. No wild life is hunted or trapped.
7. No firearms, air guns or BB guns are discharged or carried onto this property.*
8. Property owners adjacent to common lands confine personal development of facilities, landscaping, and mowing to their own property.

*Fairfax County regulations



**PROPOSAL FOR REVOLVING LOAN FUND
CALVERT COUNTY, MARYLAND**

I. APPLICANT INFORMATION

Name of Organization: _____

Address: _____

Contact Person: _____

Title: _____

Telephone No.: _____

Federal Tax ID No.: _____

II. PROJECT INFORMATION

1. Project Title: _____

2. Number of Acres Involved: _____

3. Location: _____

4. District: ____1 ____2 ____3

5. Description of Property: _____

6. Attach a location map; topographic map; and base map showing existing features.

7. Please Check All Appropriate Uses of This Property:

- | | |
|------------------------------------------------------|--------------------------------------------------|
| <input type="checkbox"/> Natural Resource Management | <input type="checkbox"/> Walking Paths |
| <input type="checkbox"/> Habitat Protection | <input type="checkbox"/> Camping |
| <input type="checkbox"/> Playing Fields | <input type="checkbox"/> Sightseeing |
| <input type="checkbox"/> Game Courts | <input type="checkbox"/> Swimming |
| <input type="checkbox"/> Hunting | <input type="checkbox"/> Boating |
| <input type="checkbox"/> Hiking | <input type="checkbox"/> Fishing/Crabbing |
| <input type="checkbox"/> Picnicking | <input type="checkbox"/> Bicycling |
| <input type="checkbox"/> Nature Study | <input type="checkbox"/> Indoor Sports |
| <input type="checkbox"/> Historical Interpretation | <input type="checkbox"/> Cultural Arts |
| <input type="checkbox"/> Playgrounds | <input type="checkbox"/> Horseback Riding |
| <input type="checkbox"/> Buffer to Existing Park | <input type="checkbox"/> Greenway to Town Center |

8. Describe plans for public access to the property:

9. Provide concept drawing of plans for property.

10. What is your purpose for acquiring this property and how does it further the goals of your organization?

11. How does the purchase of this property meet the criteria established by the County Open Space Implementation Plan. (Copies available in Dept. of Planning & Zoning.)

III. PRELIMINARY FINANCIAL INFORMATION

1. Estimated Cost of Property _____
2. Appraised Value of Property _____
3. Proposed Funding for Acquisition:

Revolving Loan Fund Request	\$ _____
Others: _____	\$ _____
_____	\$ _____
_____	\$ _____
_____	\$ _____

IV. REQUIRED DOCUMENTS & INFORMATION

- () Letters of Commitment from All Other Sources of Financing
- () Real Estate Appraisal
- () Financial Statements for Three Years
- () Financial Projections
- () Copy of IRS Status of Determination letter
- () List of Officers and Board of Directors

